

FIG. 1 (a)

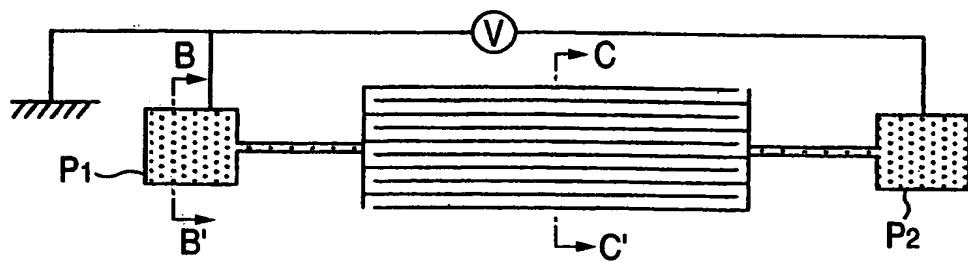


FIG. 1 (b)

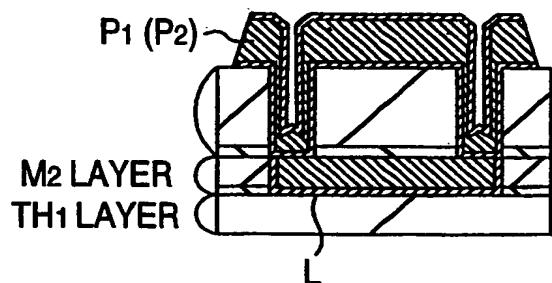


FIG. 1 (c)

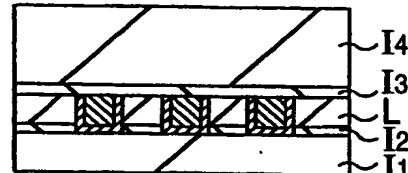


FIG. 2

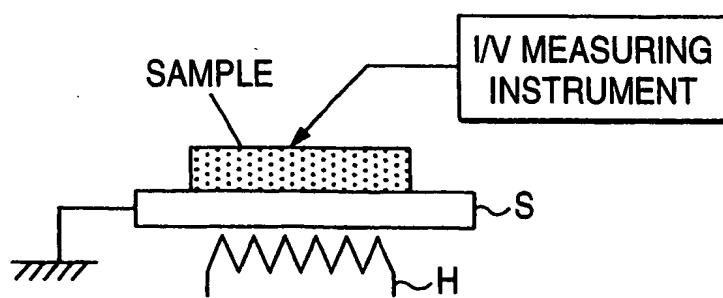


FIG. 3

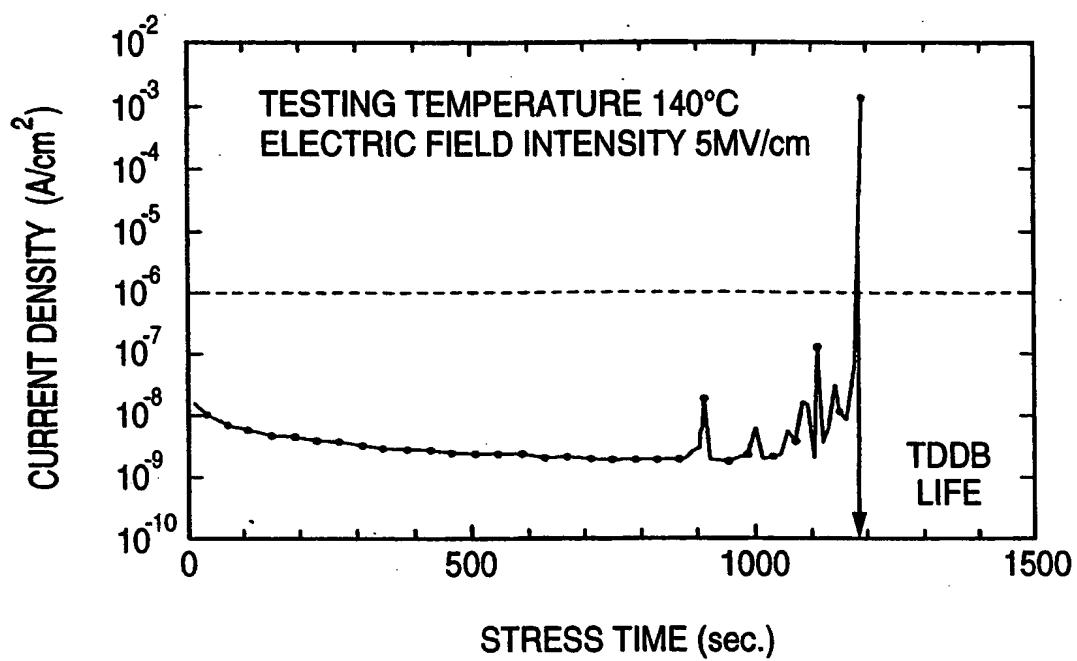


FIG. 4

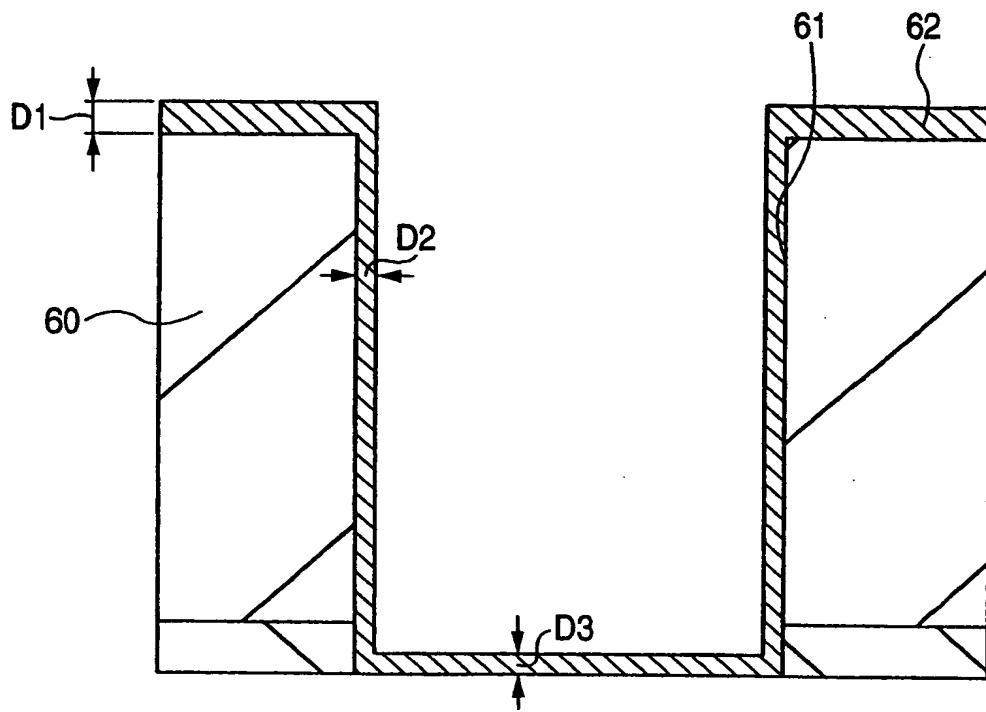


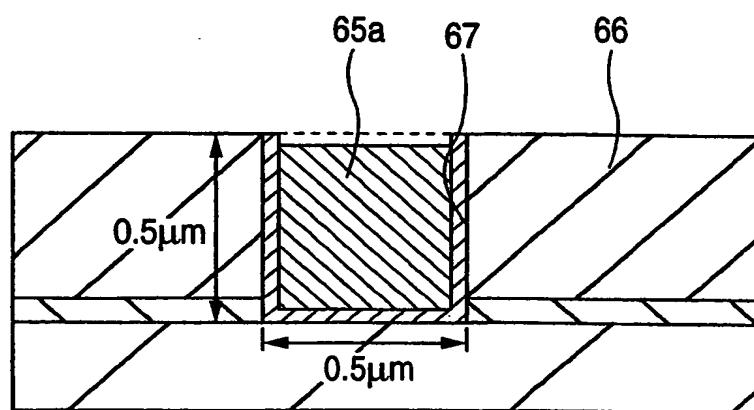
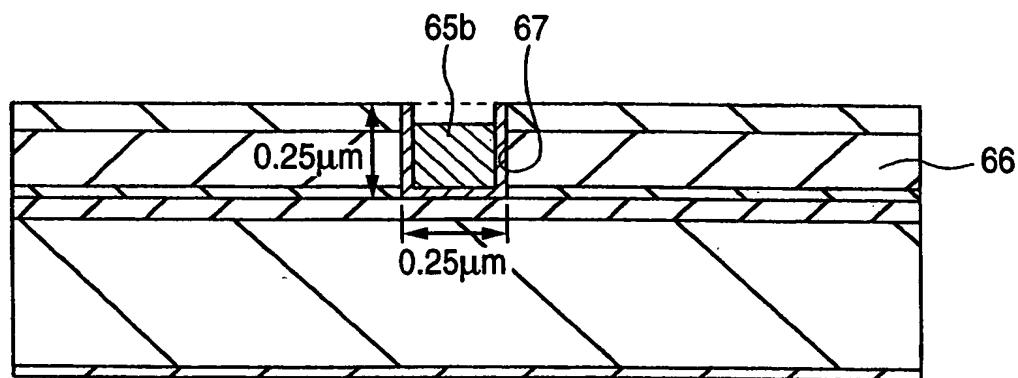
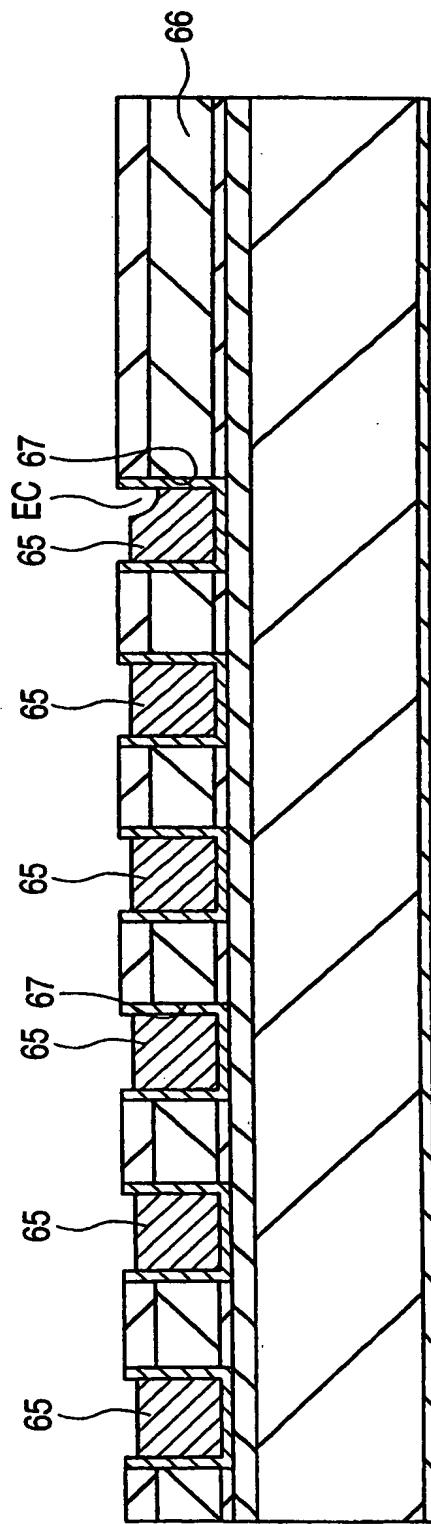
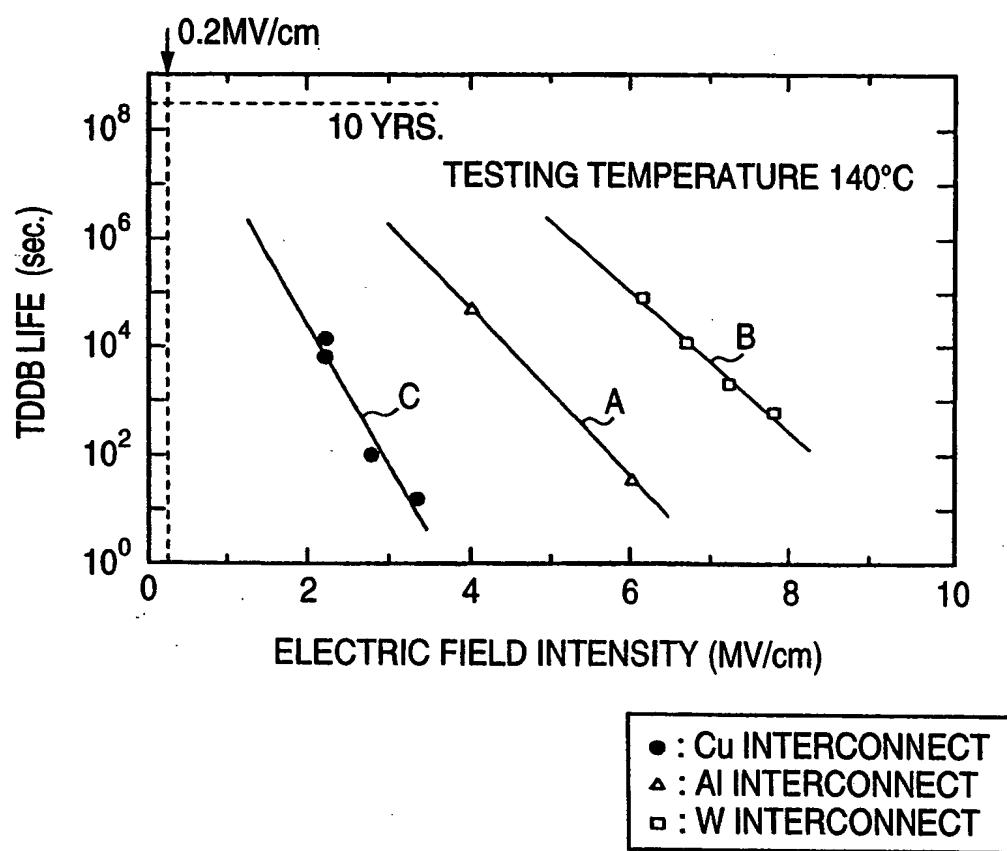
FIG. 5 (a)*FIG. 5 (b)*

FIG. 6



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FIG. 7



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FIG. 8

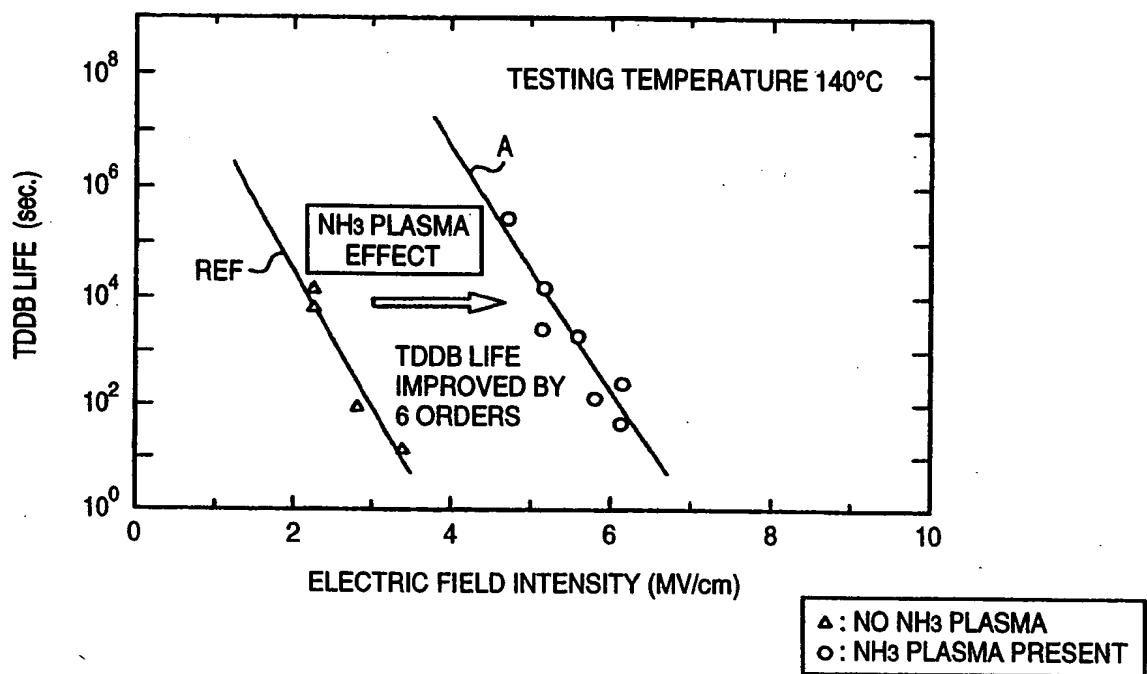


FIG. 9

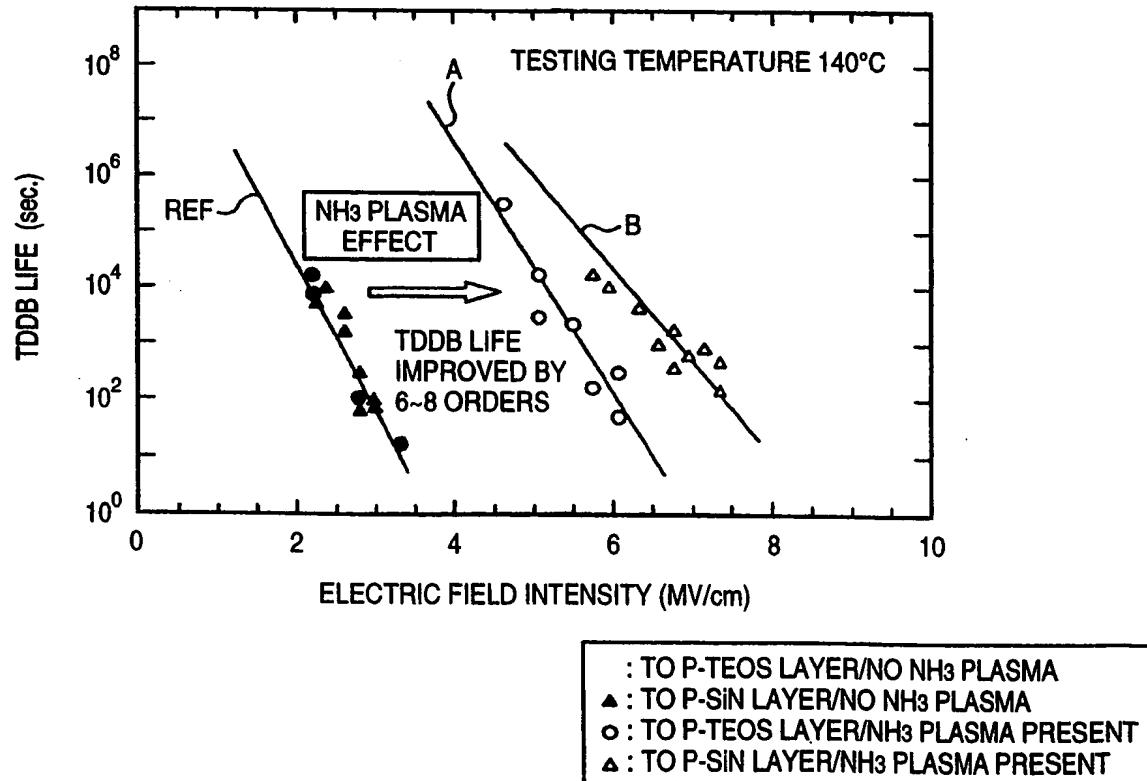


FIG. 10 (a)

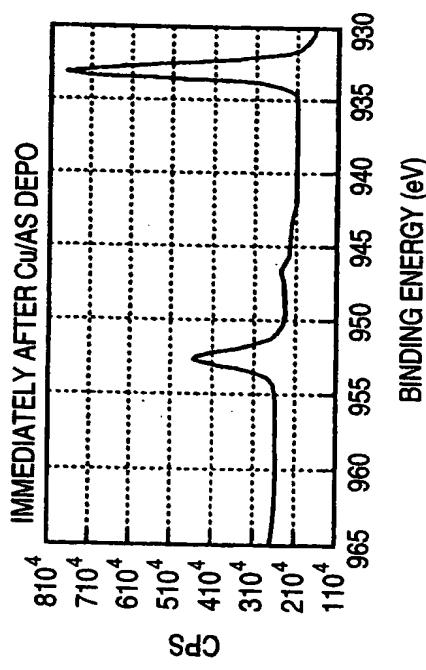


FIG. 10 (b)

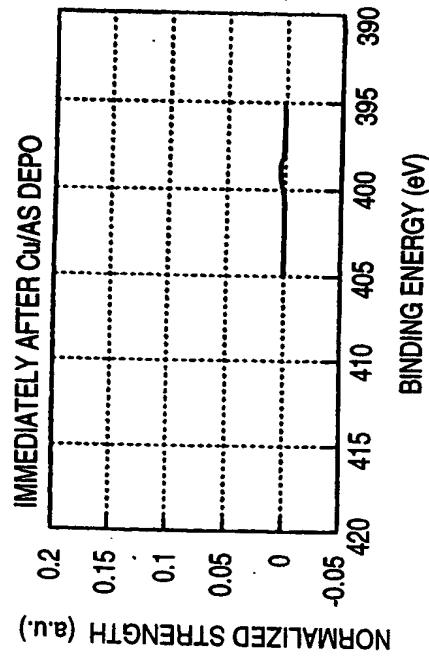


FIG. 10 (c)

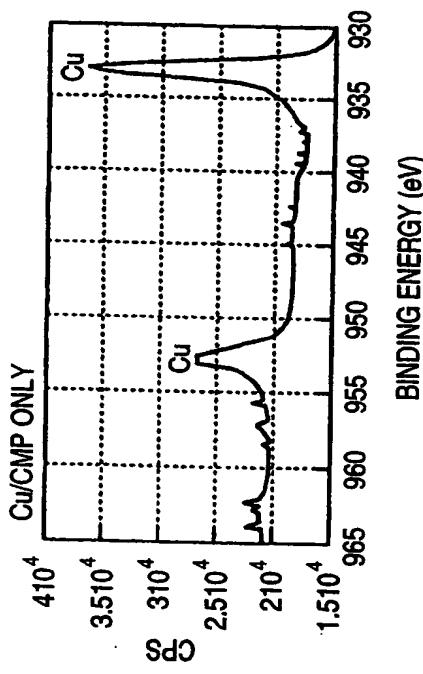


FIG. 10 (d)

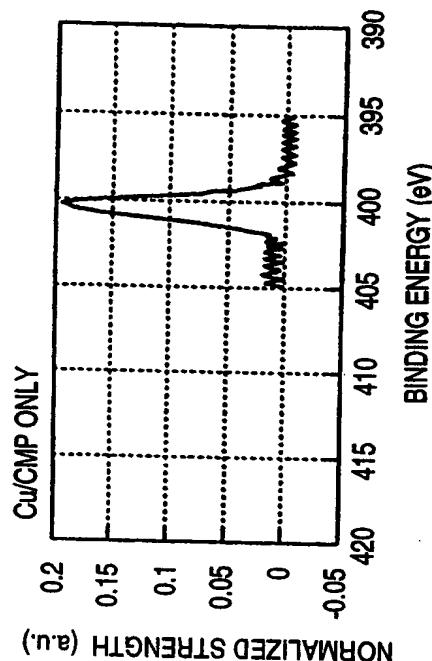


FIG. 11 (a)

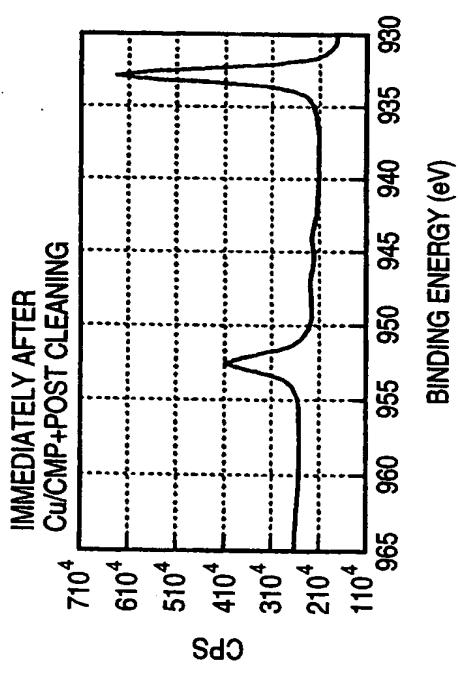


FIG. 11 (b)

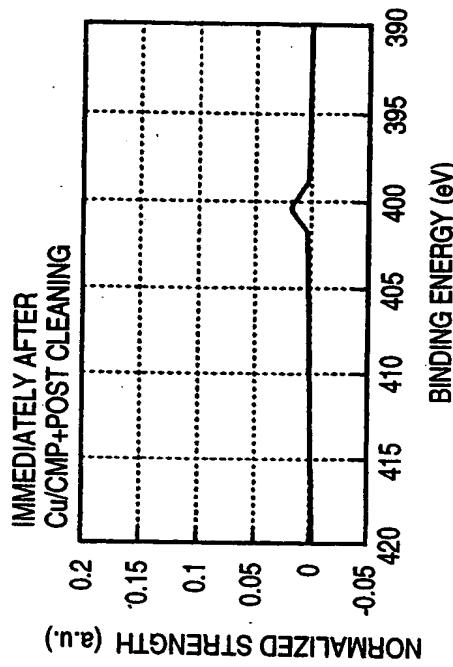


FIG. 11 (c)

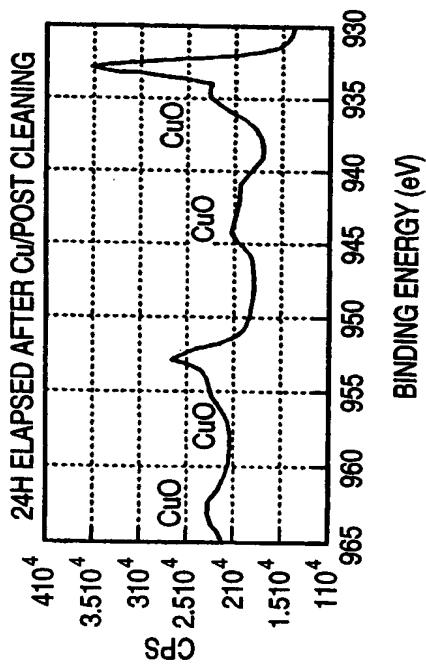


FIG. 11 (d)

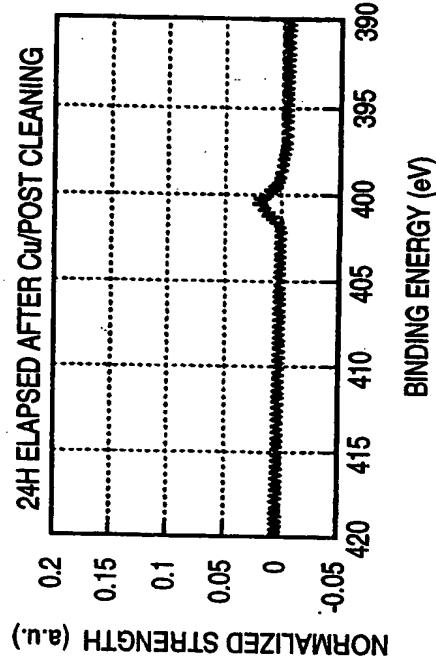


FIG. 12 (a)

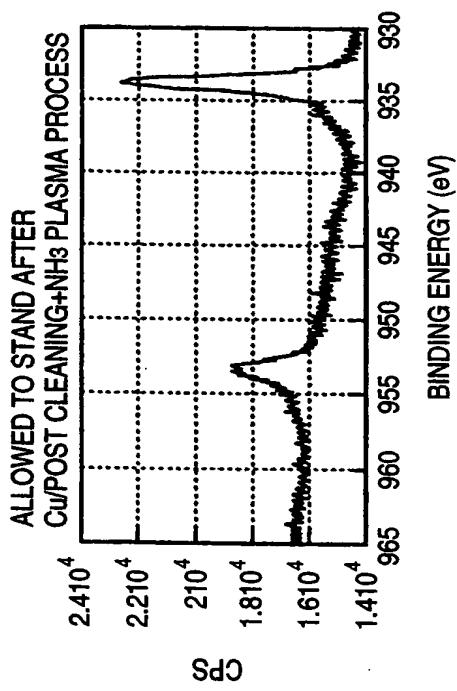


FIG. 12 (b)

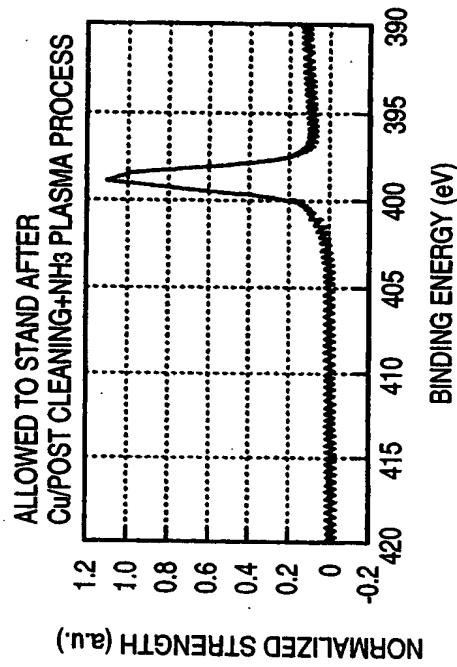


FIG. 12 (c)

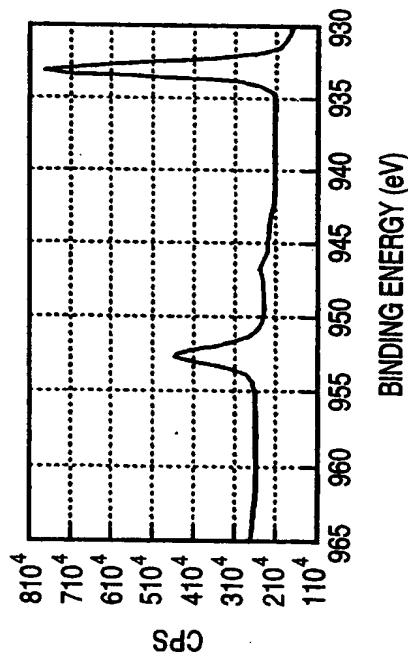


FIG. 12 (d)

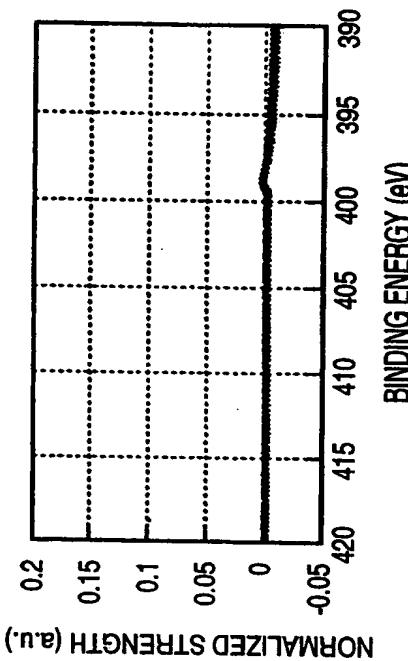
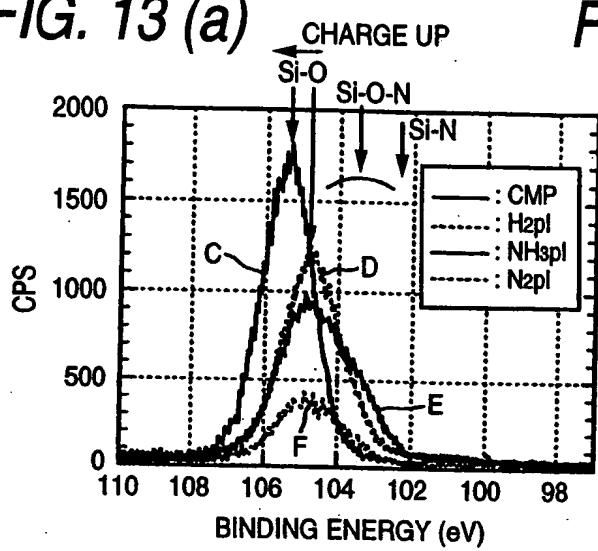
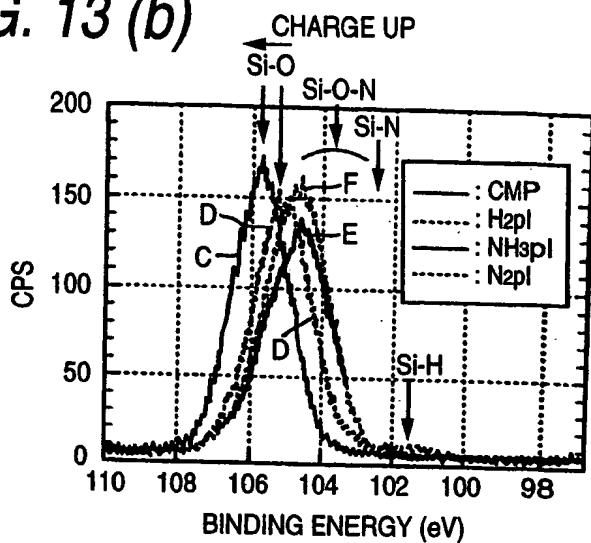
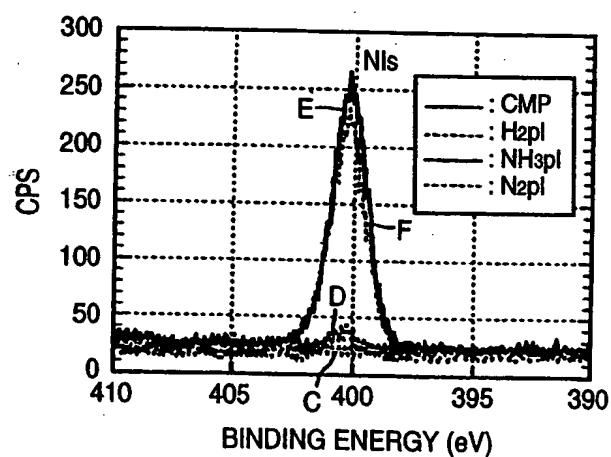
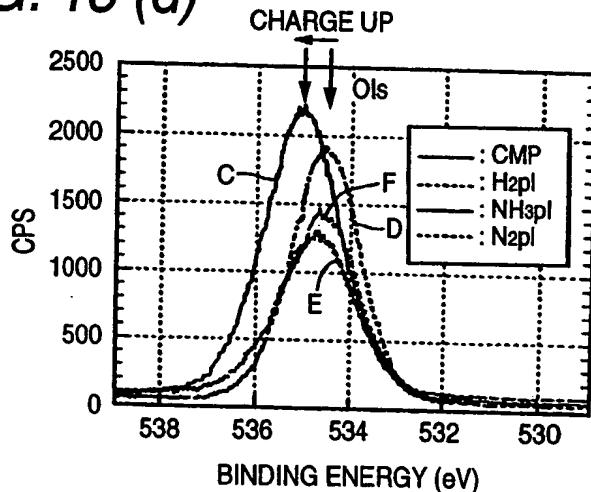
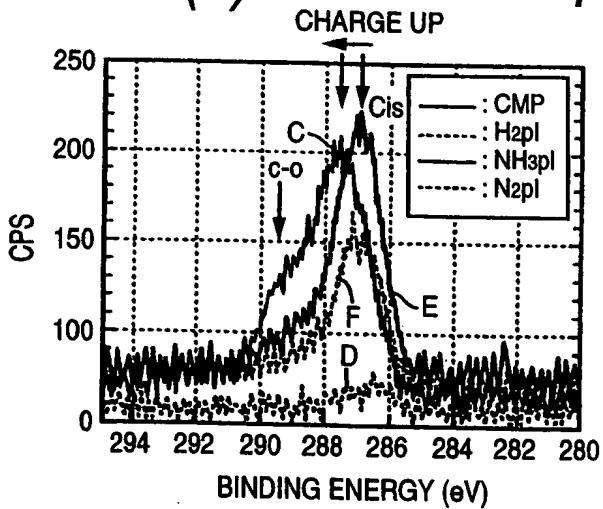
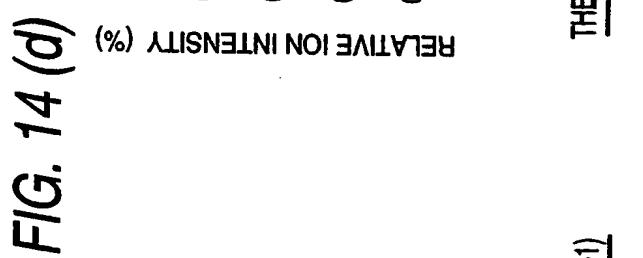
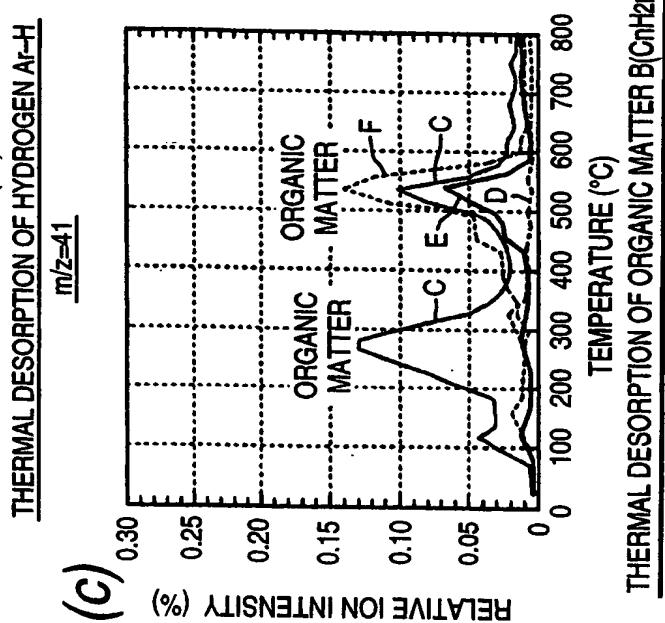
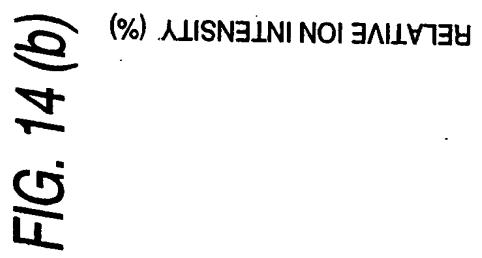
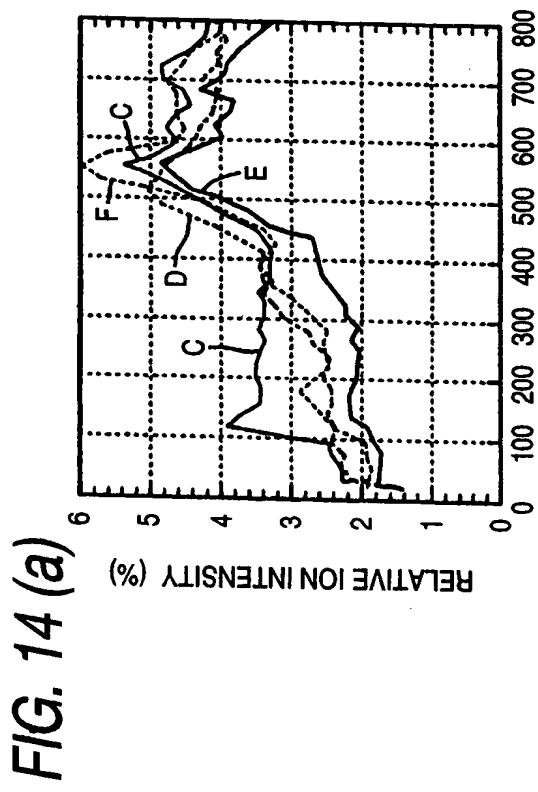


FIG. 13 (a)**FIG. 13 (b)****FIG. 13 (c)****FIG. 13 (d)****FIG. 13 (e)****FIG. 13 (f)**

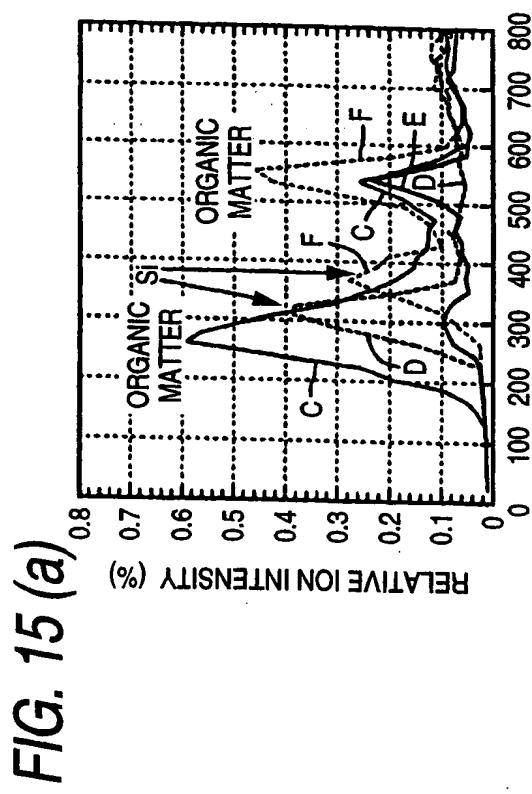
CONDITION	Si ₃ N _x
CMP	-
H ₂ pl	Si ₃ N _{1.08}
NH ₃ pl	Si ₃ N _{4.22}
N ₂ pl	Si ₃ N _{3.81}



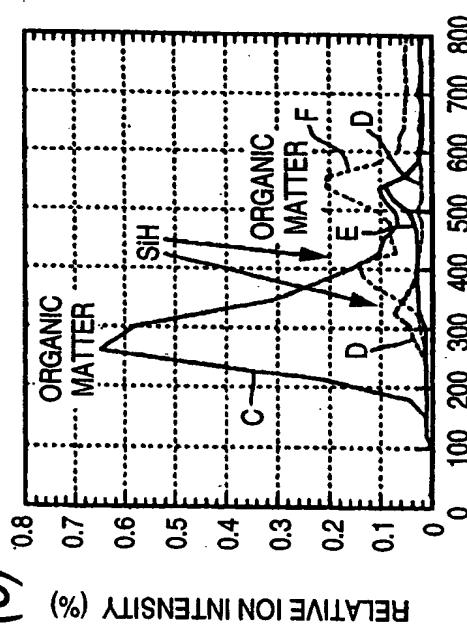
THERMAL DESORPTION OF ORGANIC MATTER A(C_nH_{2n+1})

THERMAL DESORPTION OF ORGANIC MATTER B(C_nH_{2n+1})

THERMAL DESORPTION OF ORGANIC MATTER C(C_nH_{2n+10})



THERMAL DESORPTION OF Si & ORGANIC MATTER



THERMAL DESORPTION OF SiH & ORGANIC MATTER



THERMAL DESORPTION OF SiO & ORGANIC MATTER



THERMAL DESORPTION OF SiH₃ & ORGANIC MATTER

FIG. 16

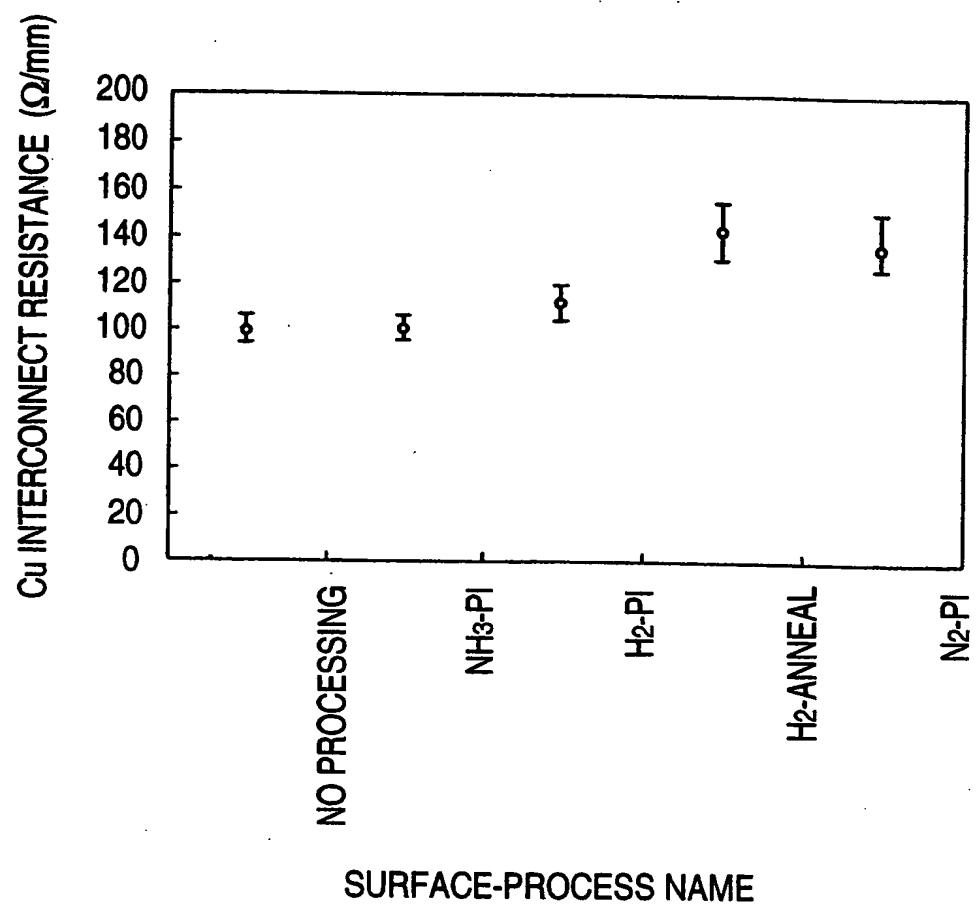


FIG. 17

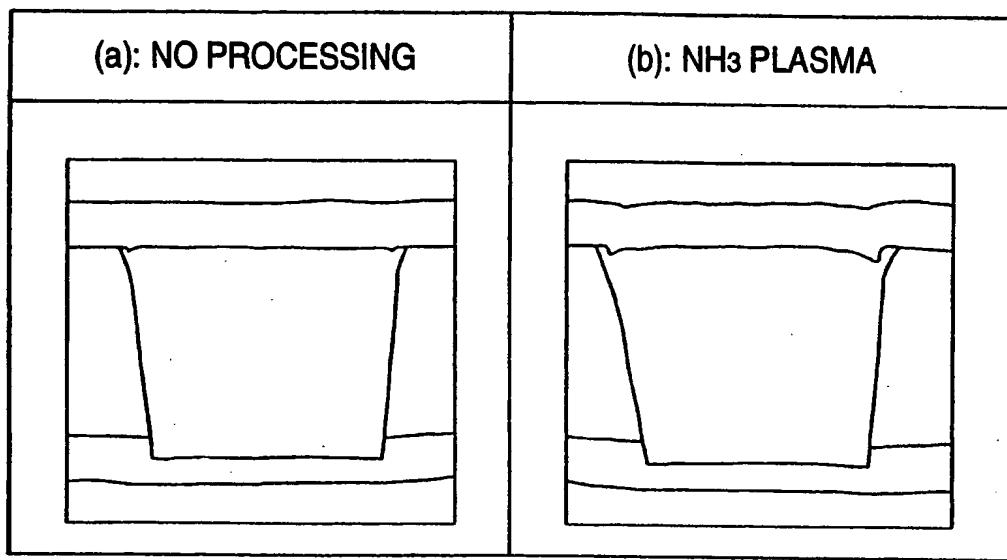
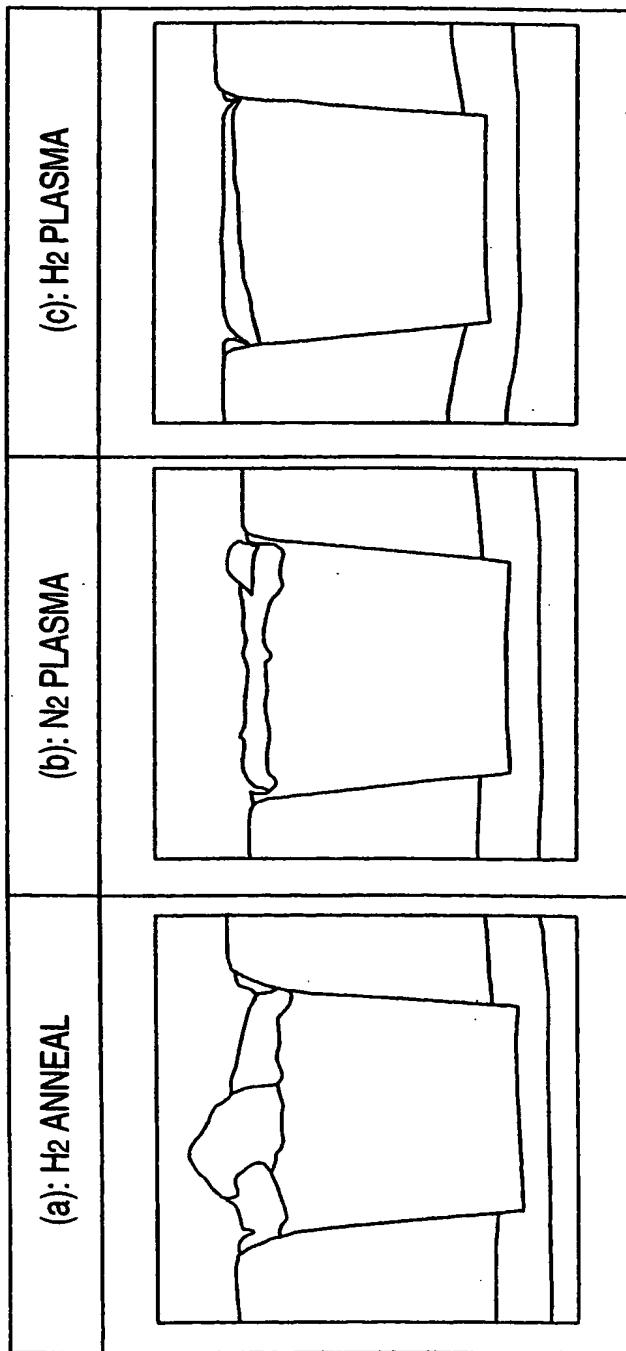


FIG. 18



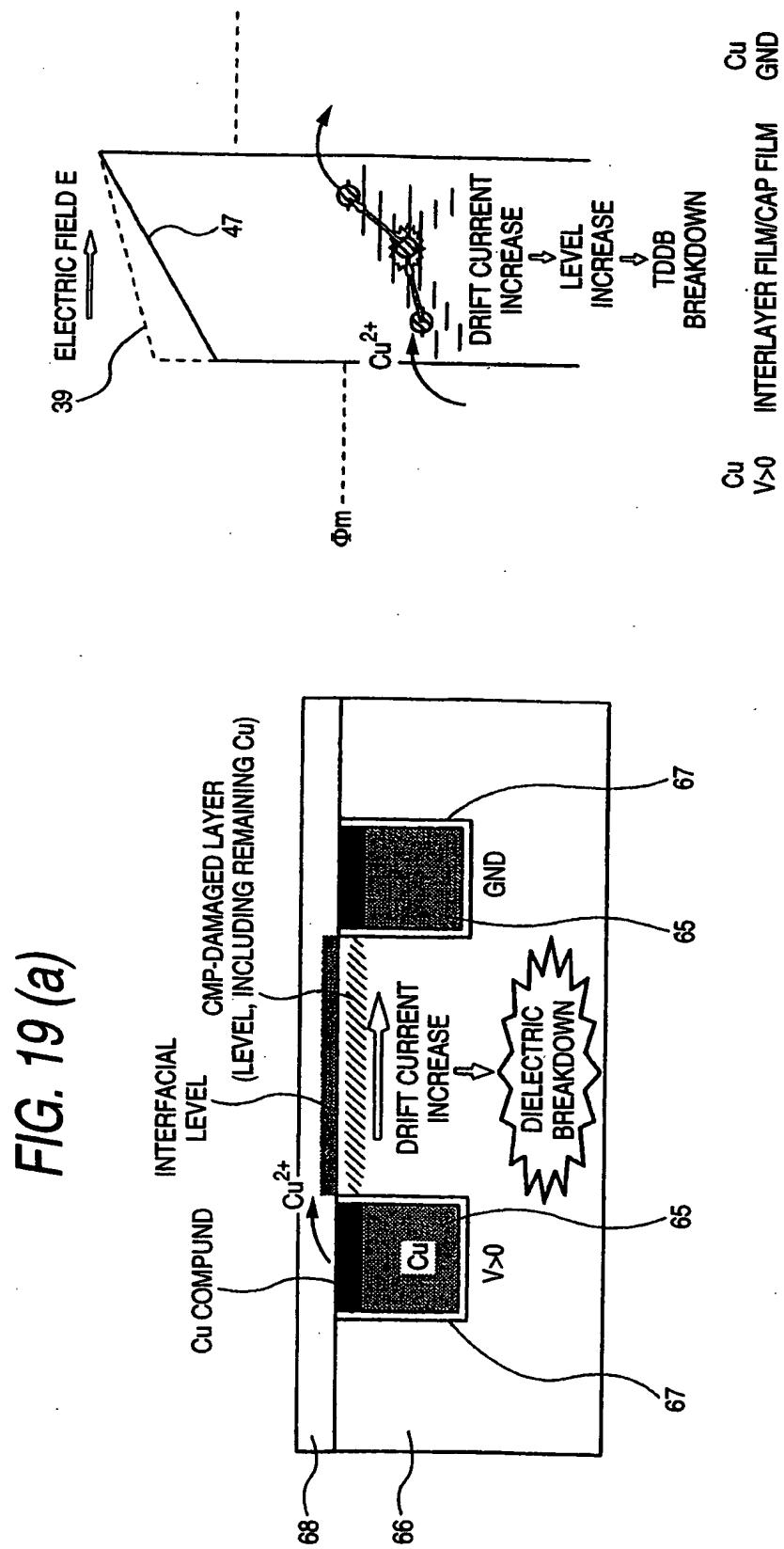


FIG. 20 (a)

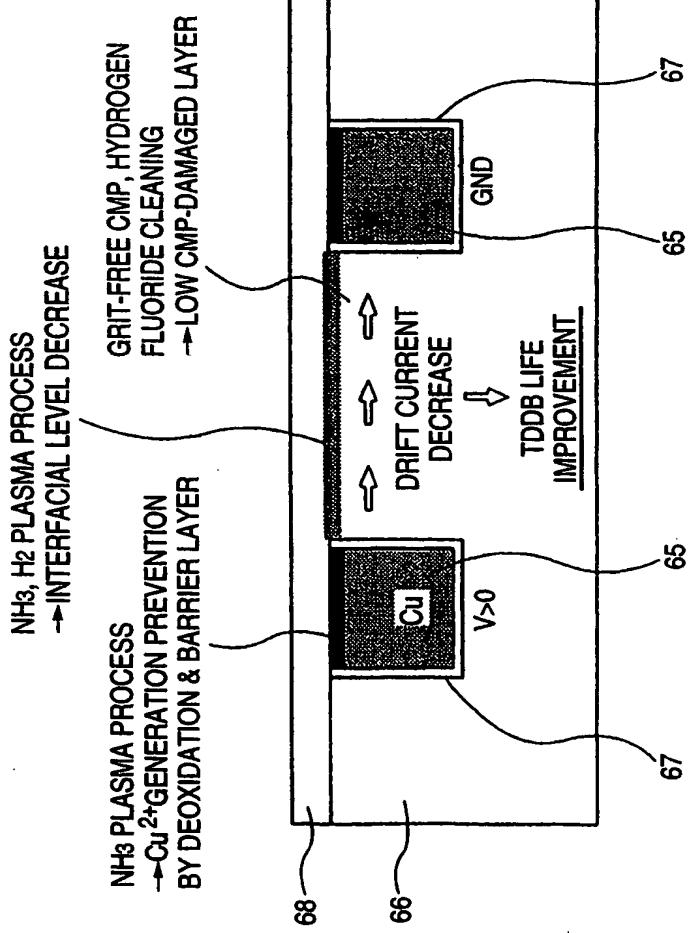


FIG. 20 (b)

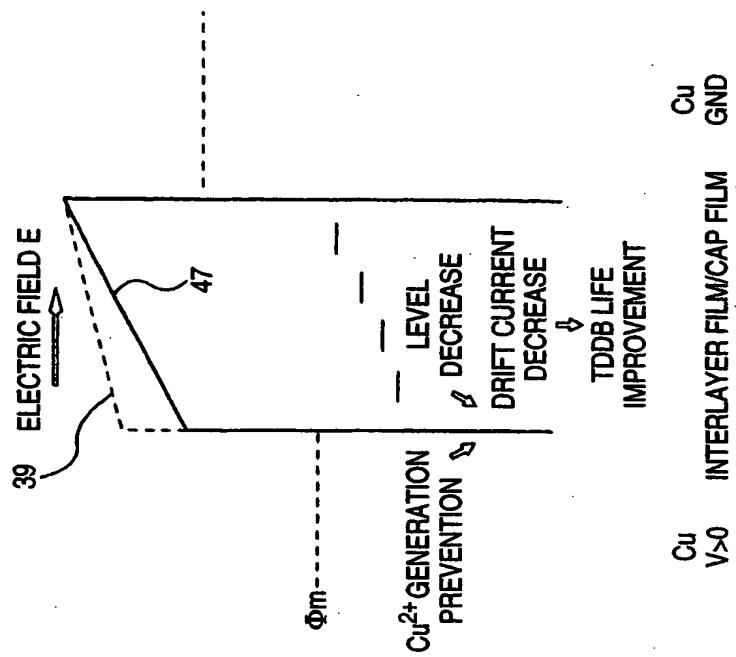


FIG. 21

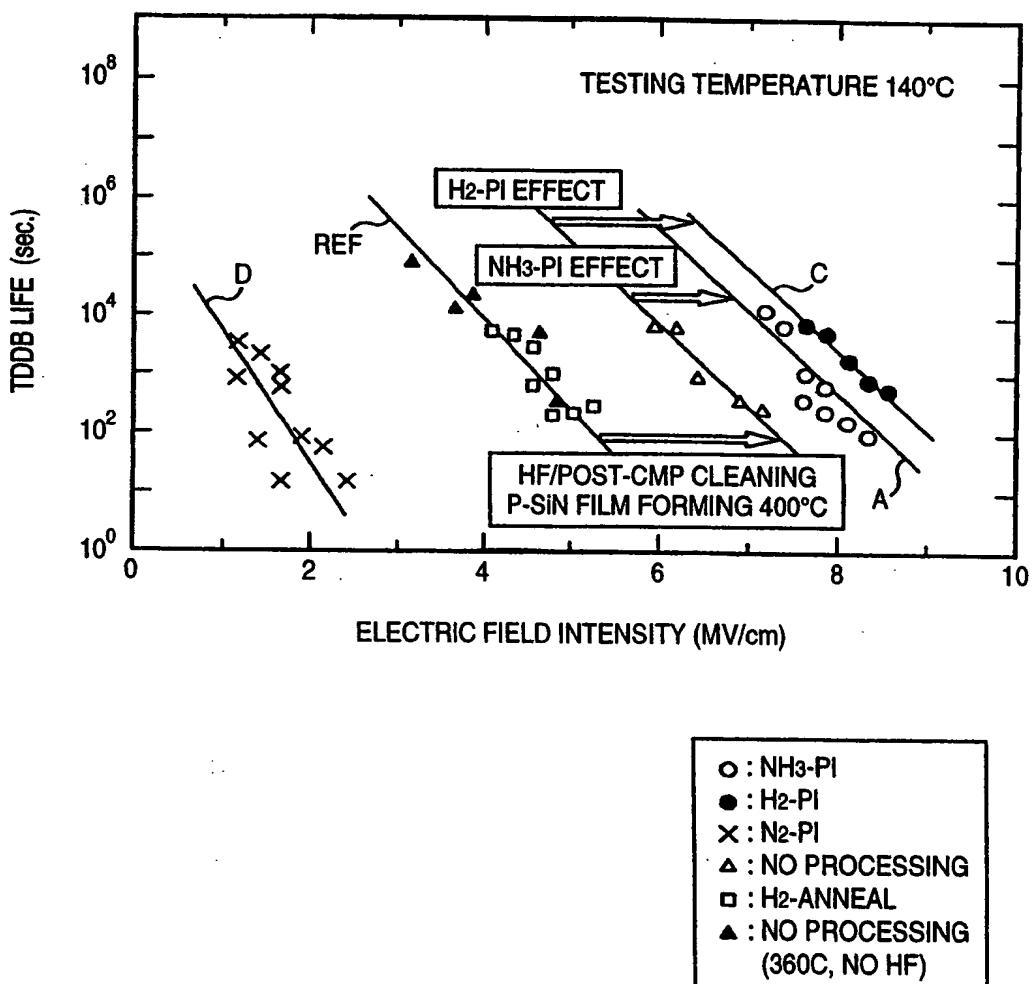
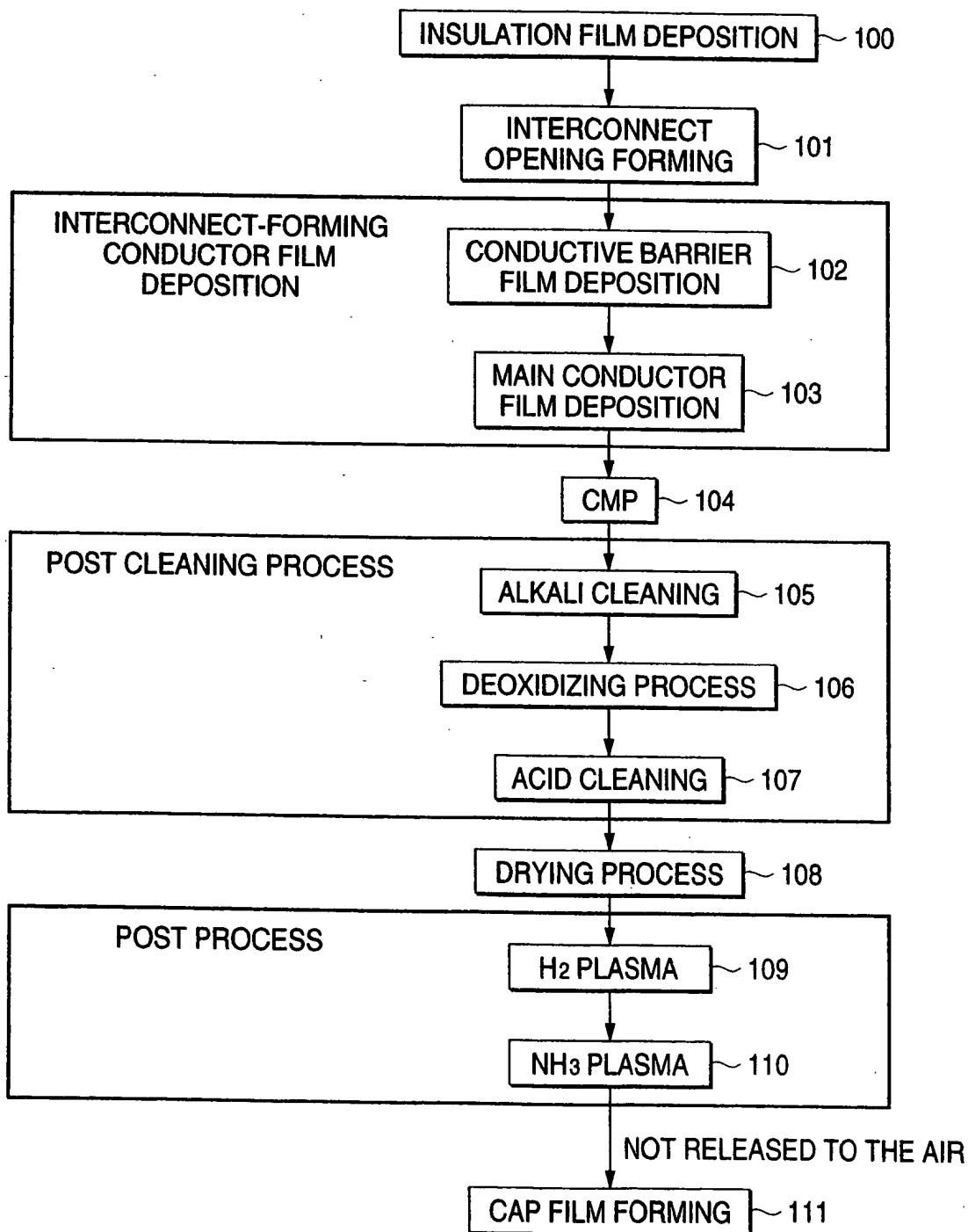


FIG. 22



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FIG. 23 (a)

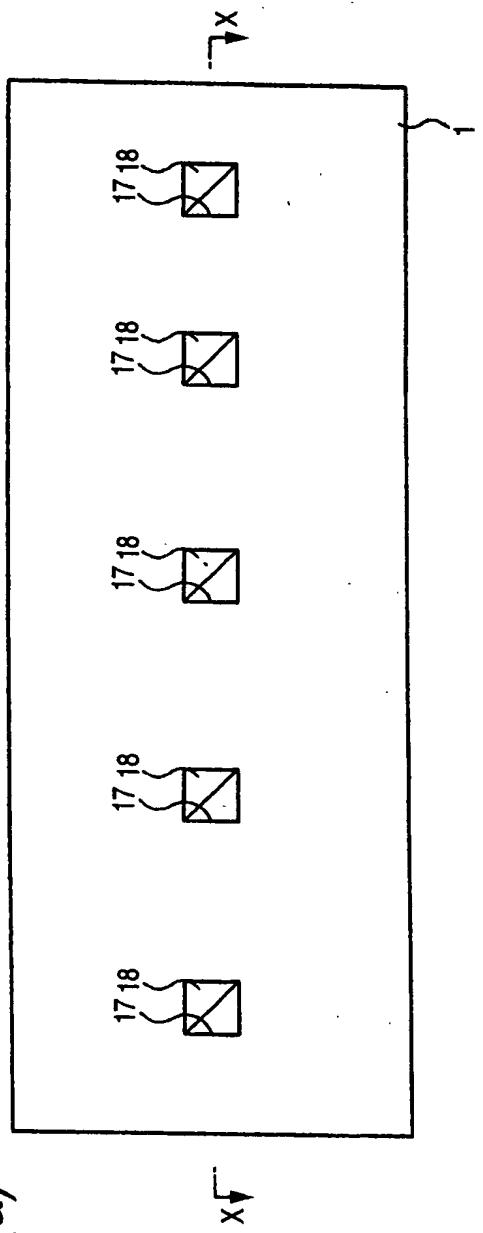


FIG. 23 (b)

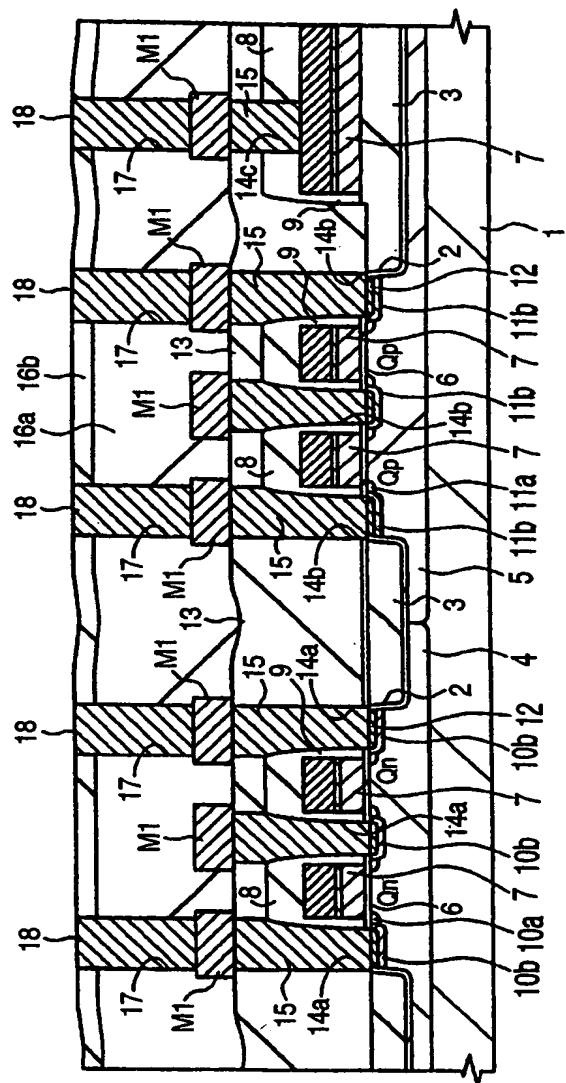


FIG. 24 (a)

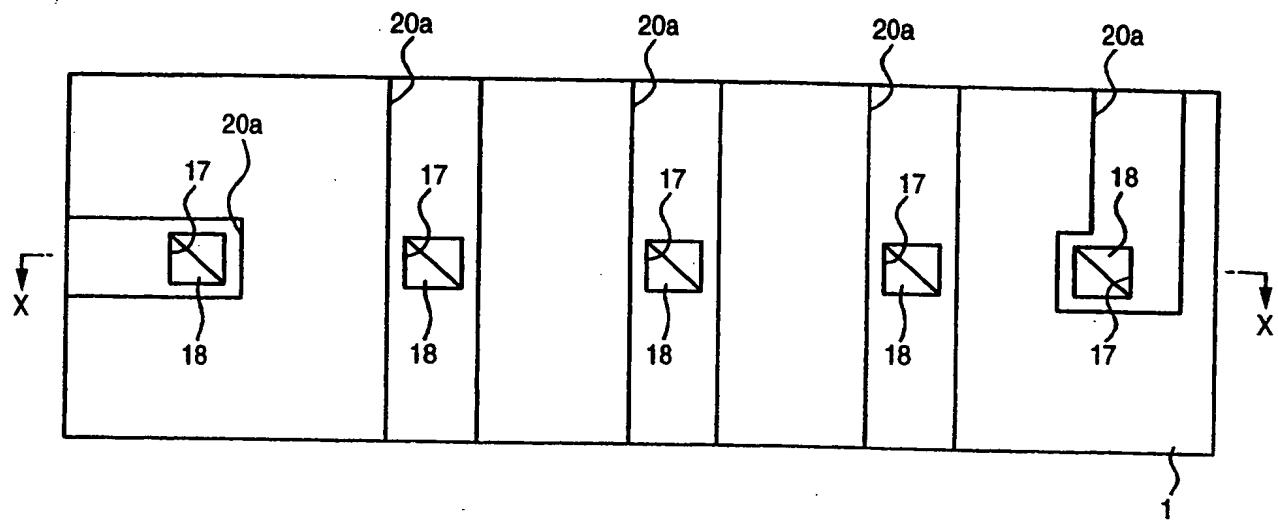


FIG. 24 (b)

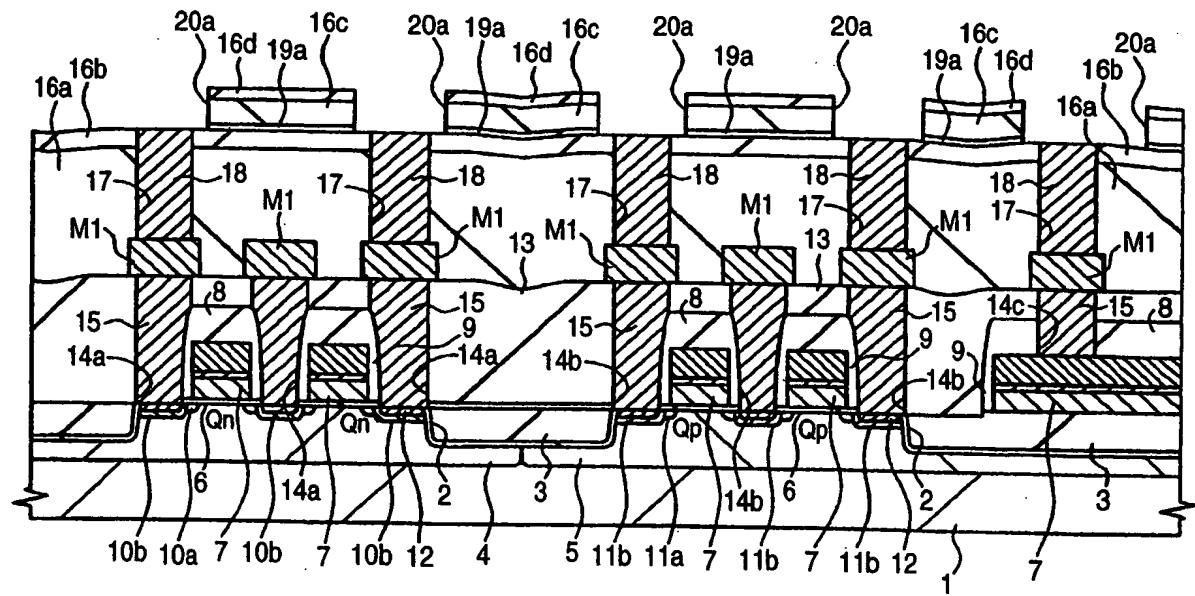


FIG. 25

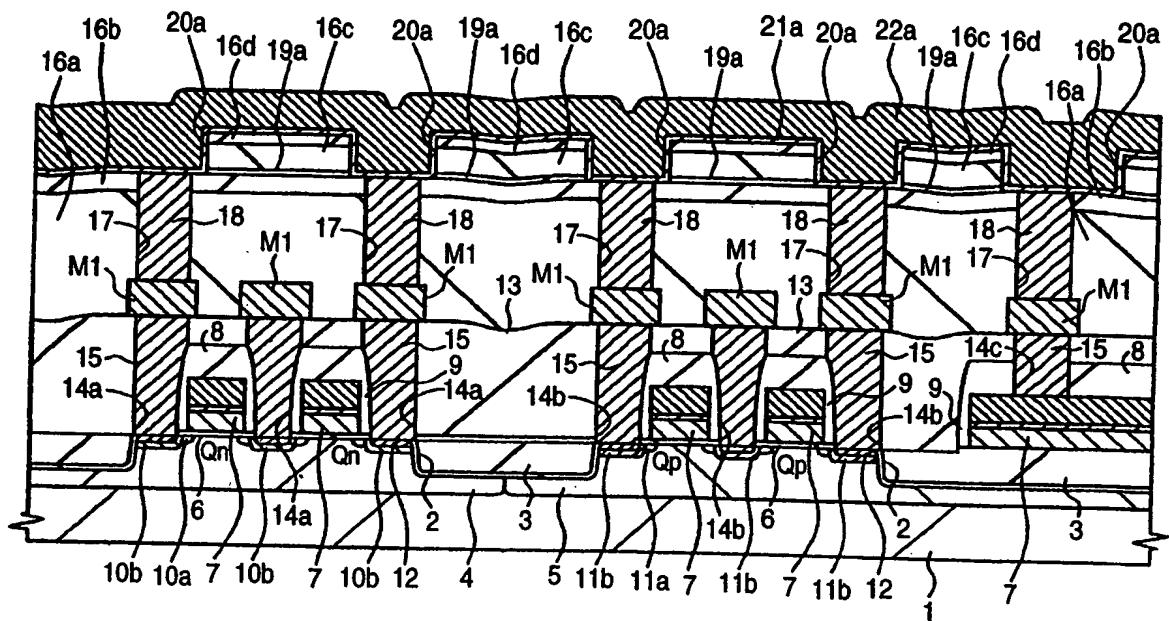


FIG. 26

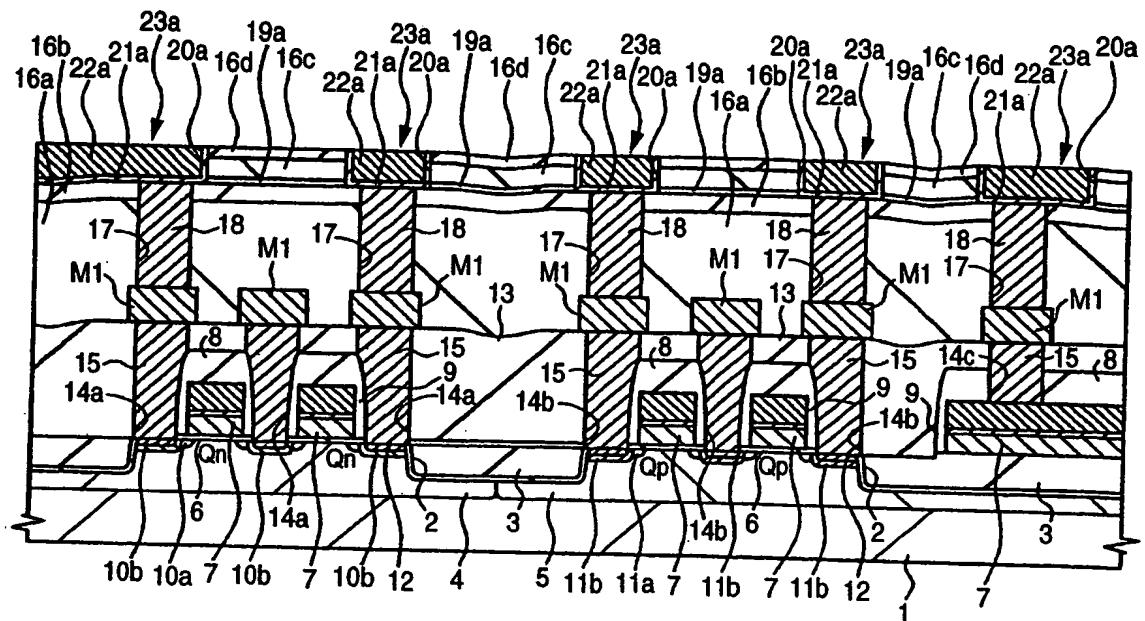


FIG. 27

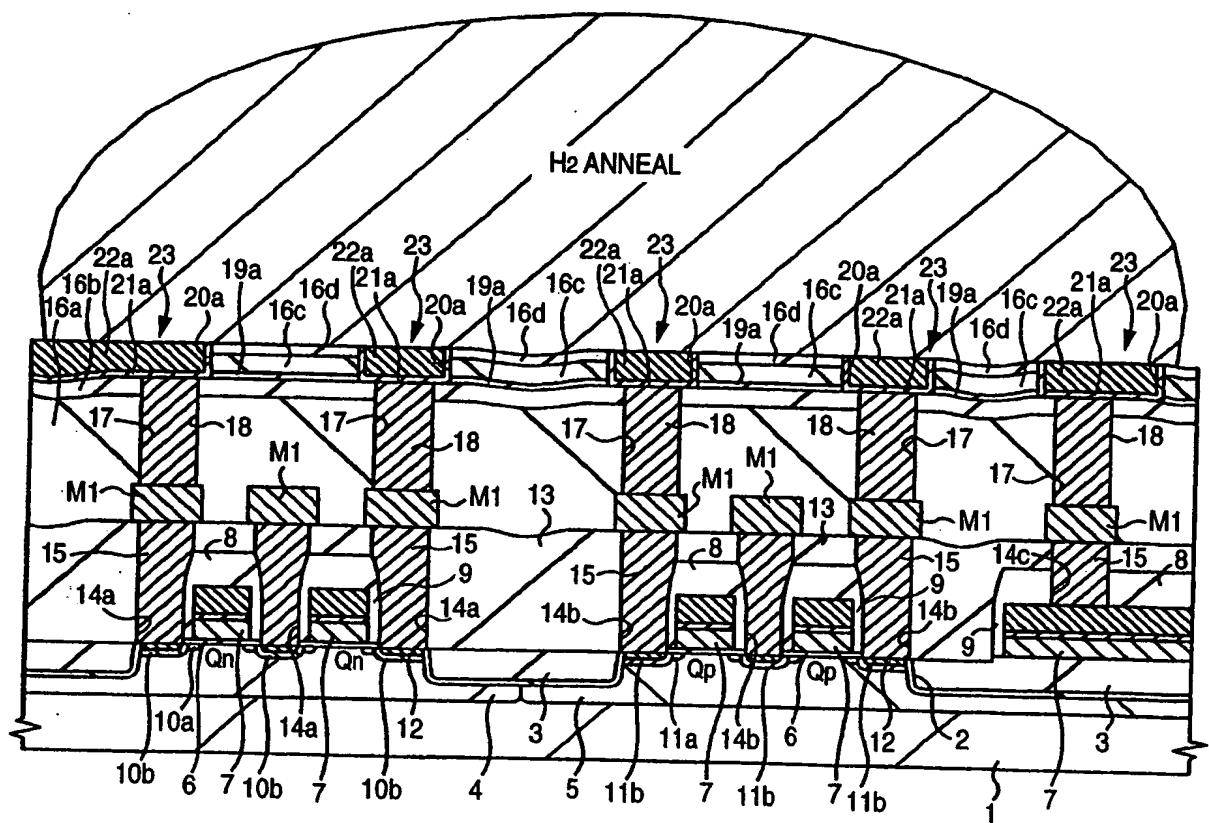
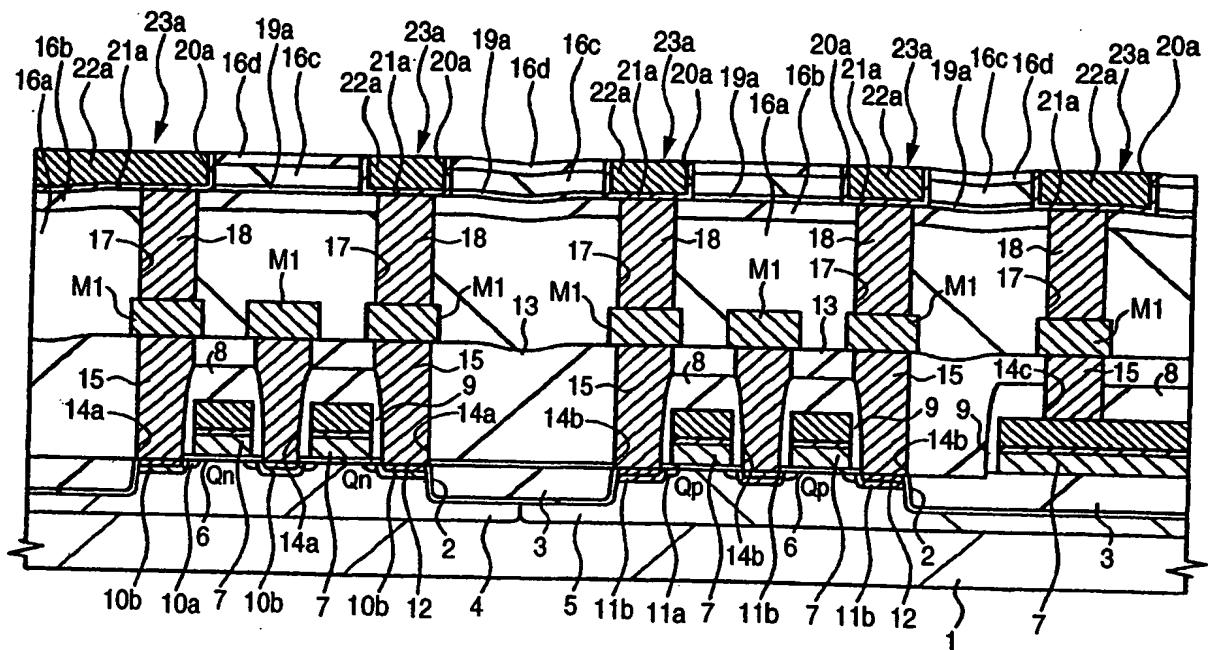
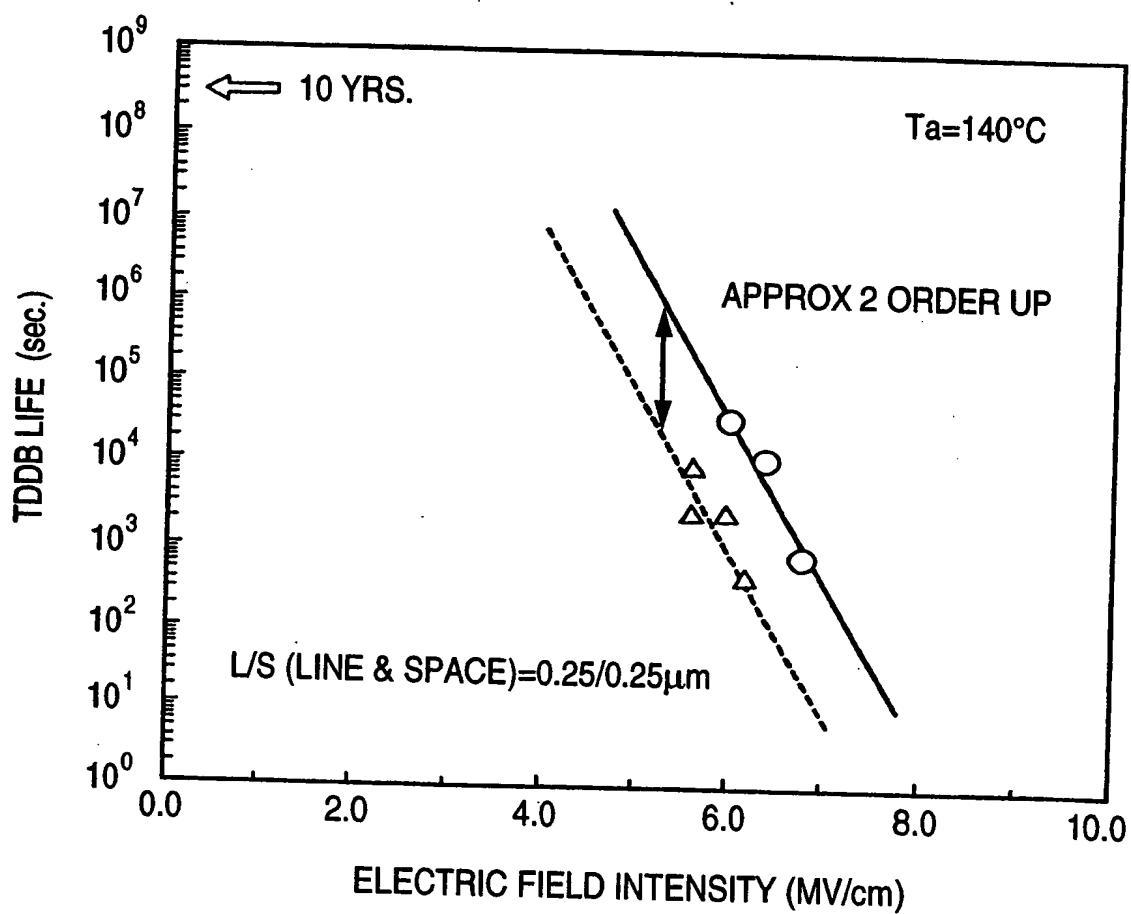


FIG. 28



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FIG. 29



-△- : DAE+HF CLEANING
-○- : DAE → H₂ ANNEAL → HF CLEANING

FIG. 30

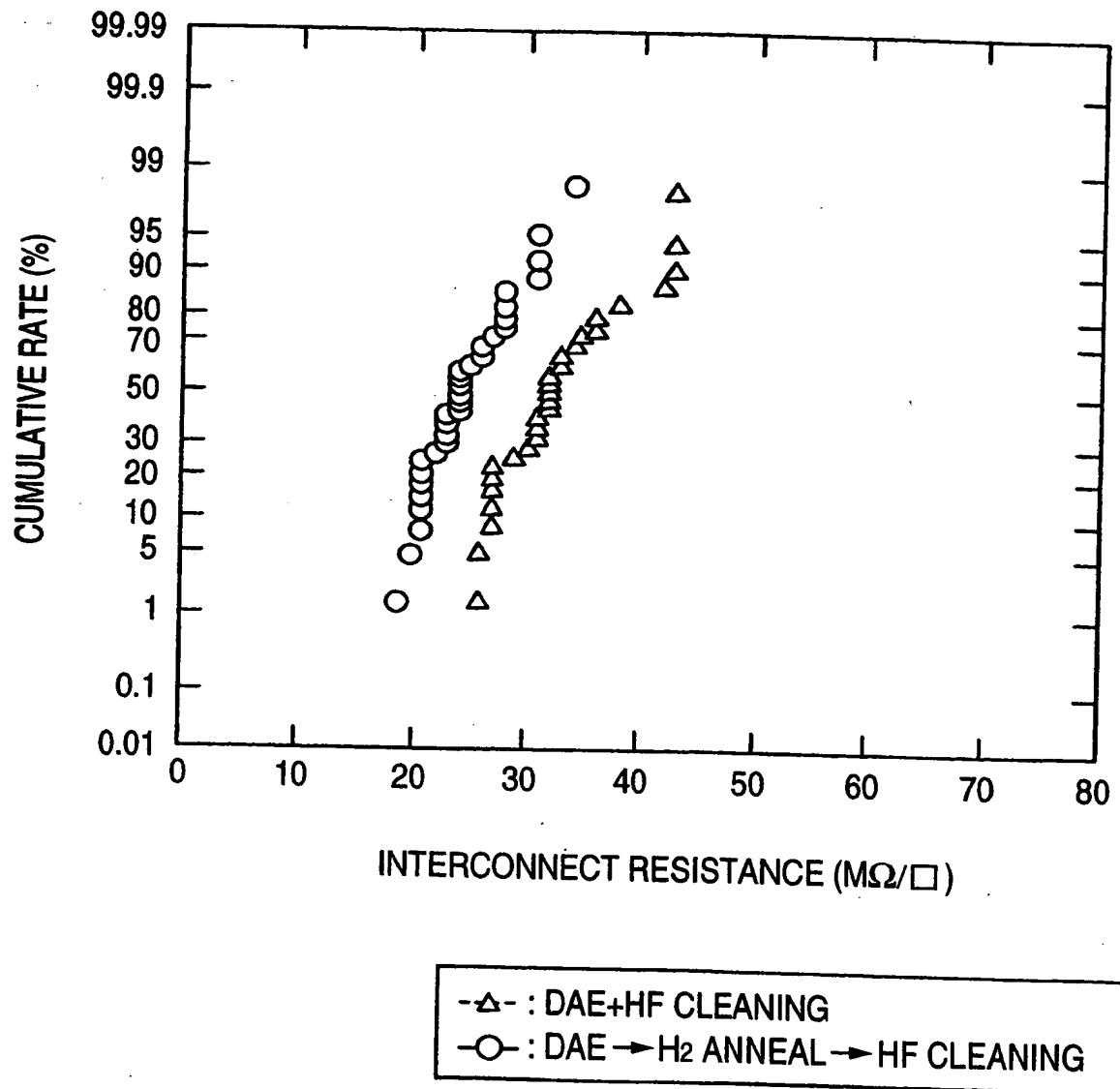


FIG. 31

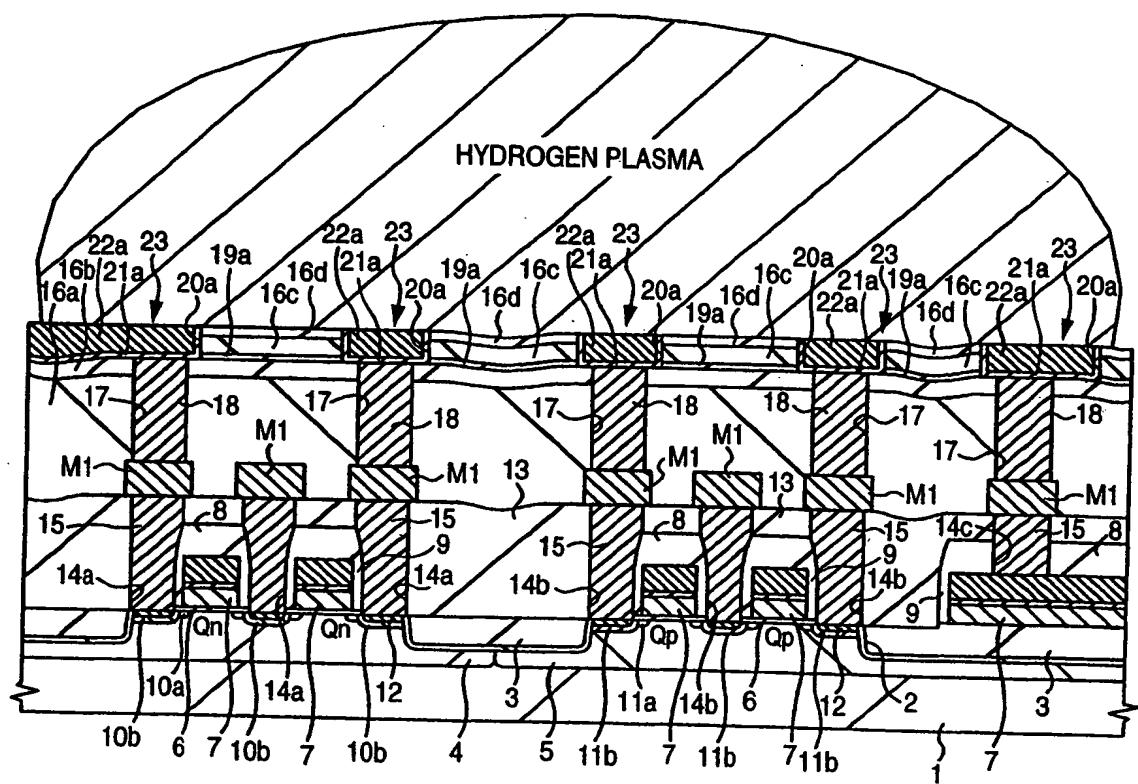


FIG. 32

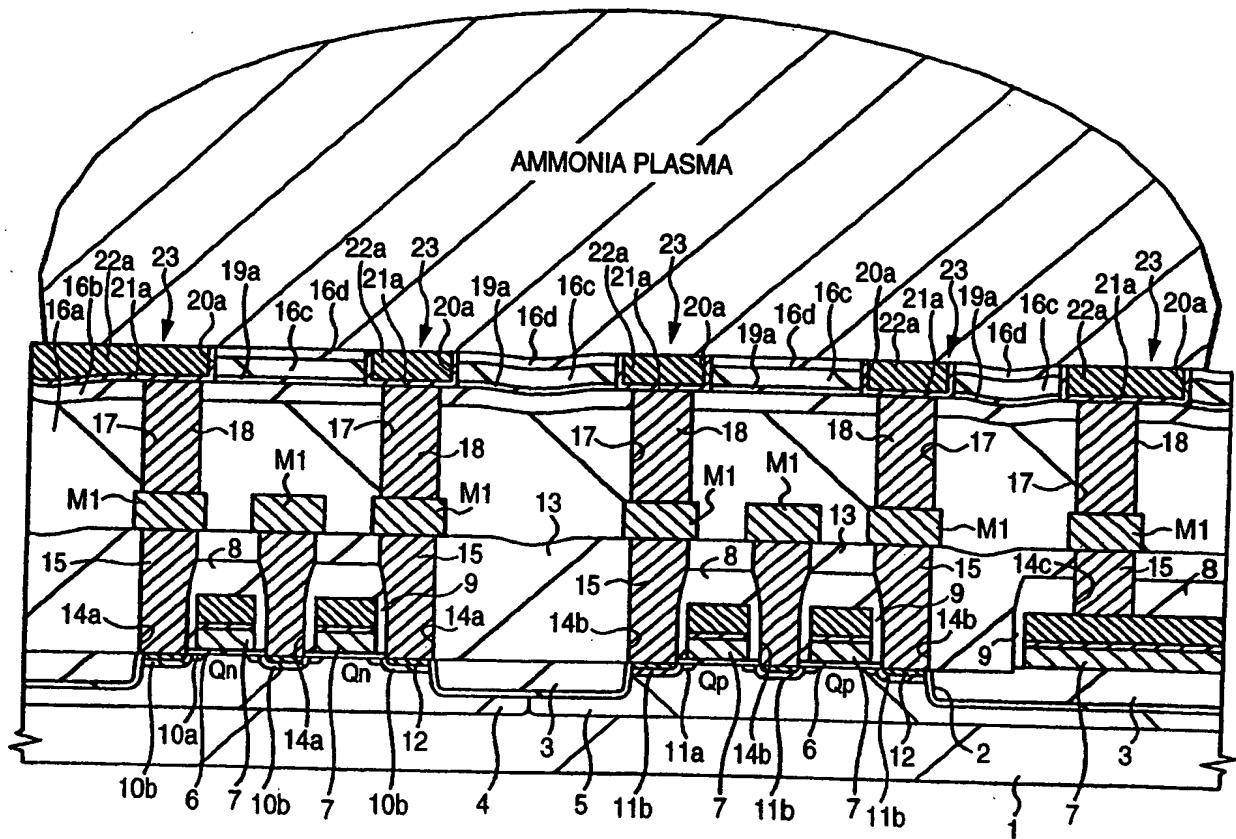


FIG. 33

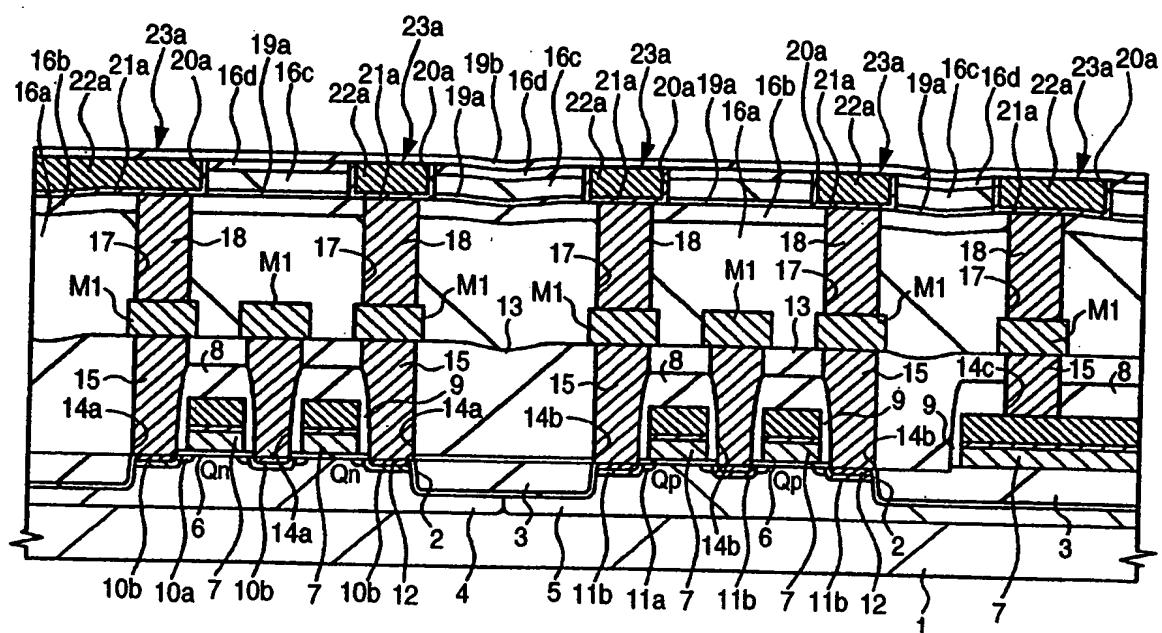
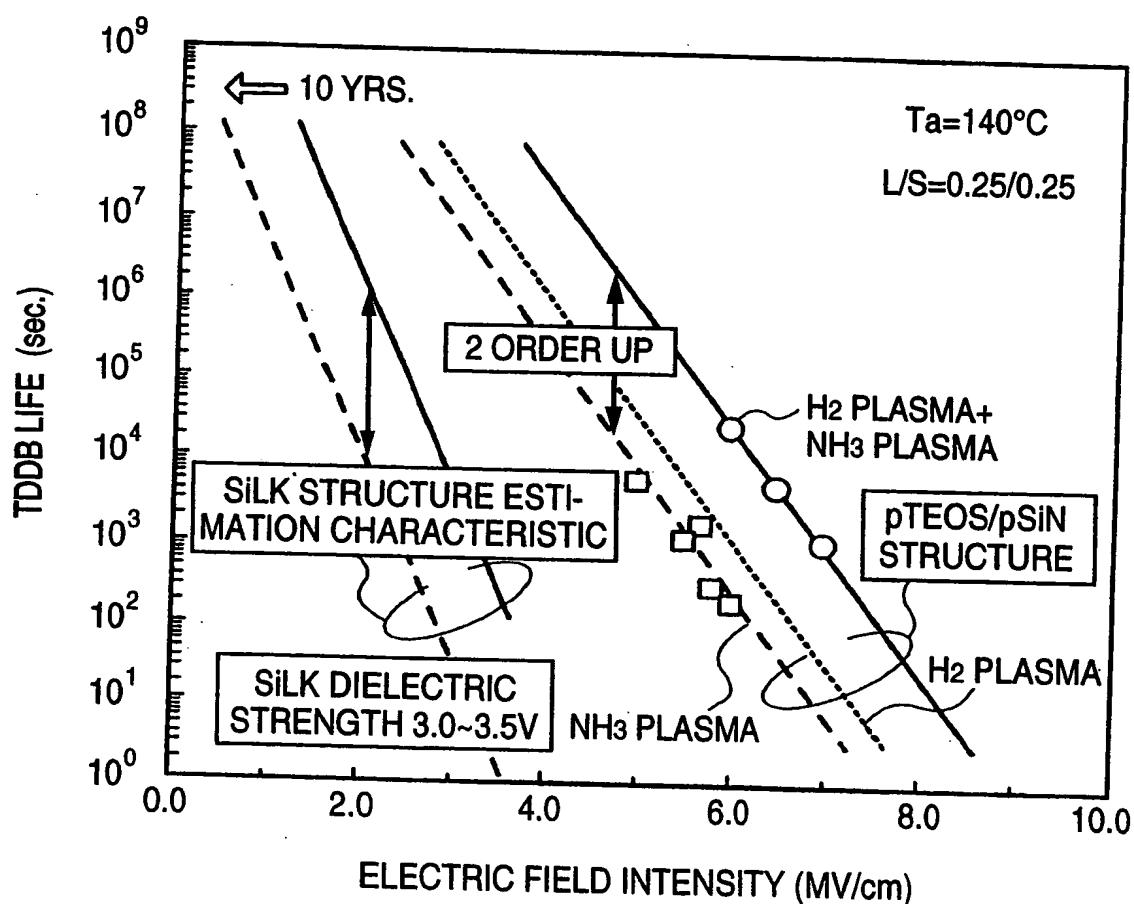


FIG. 34



-□- : NH₃ PLASMA
-○- : H₂ PLASMA+NH₃ PLASMA

FIG. 35

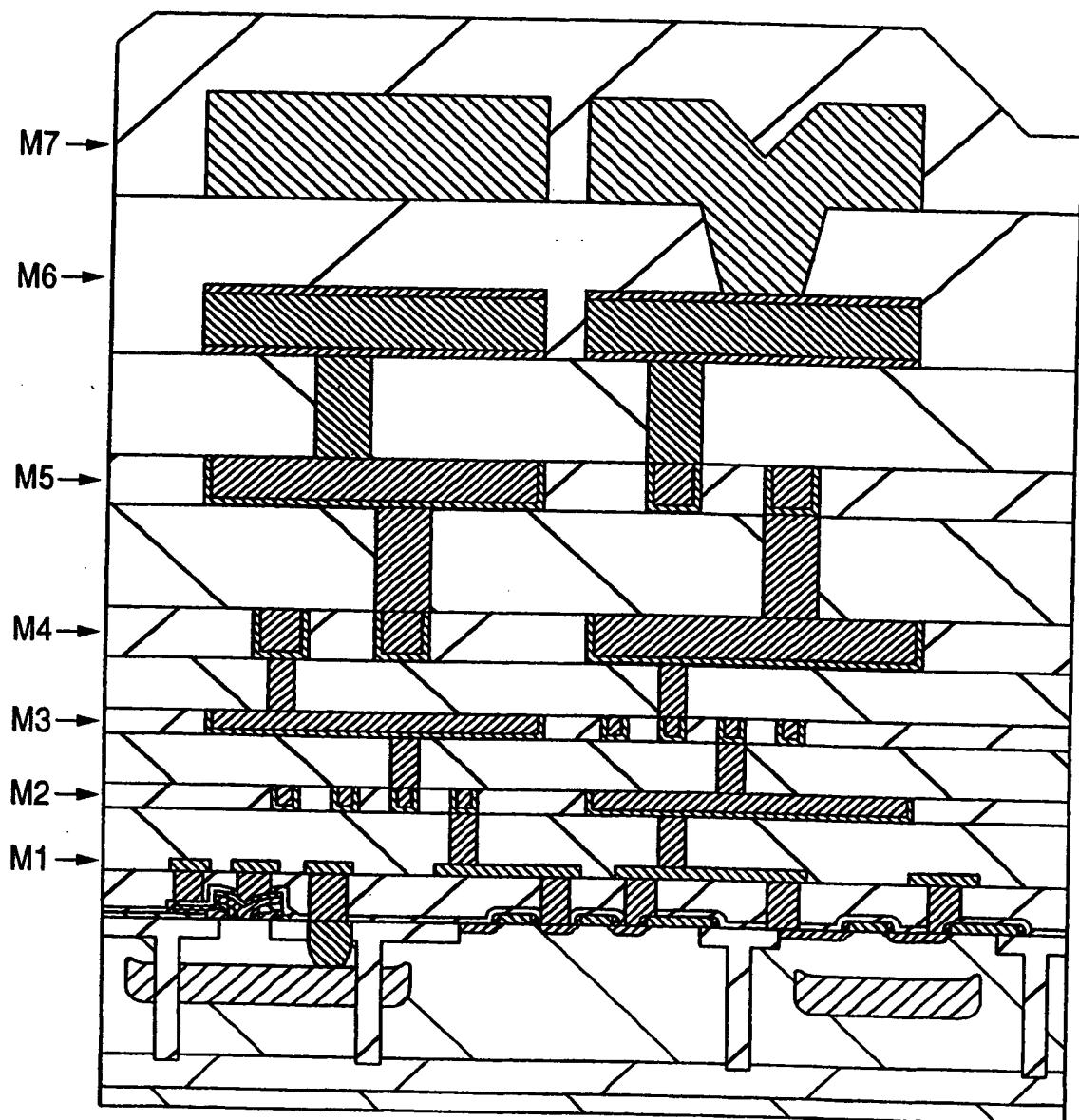


FIG. 36

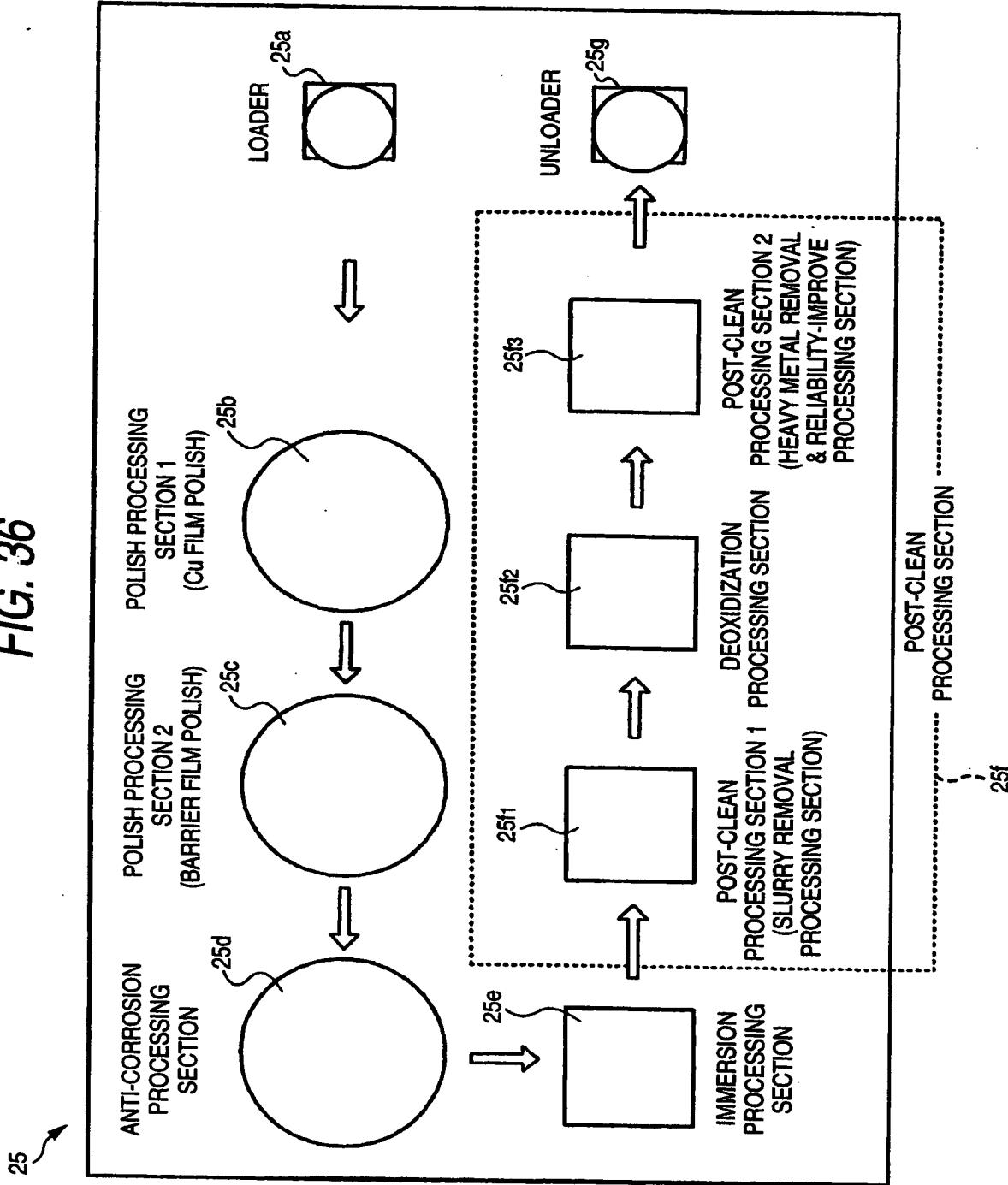


FIG. 37

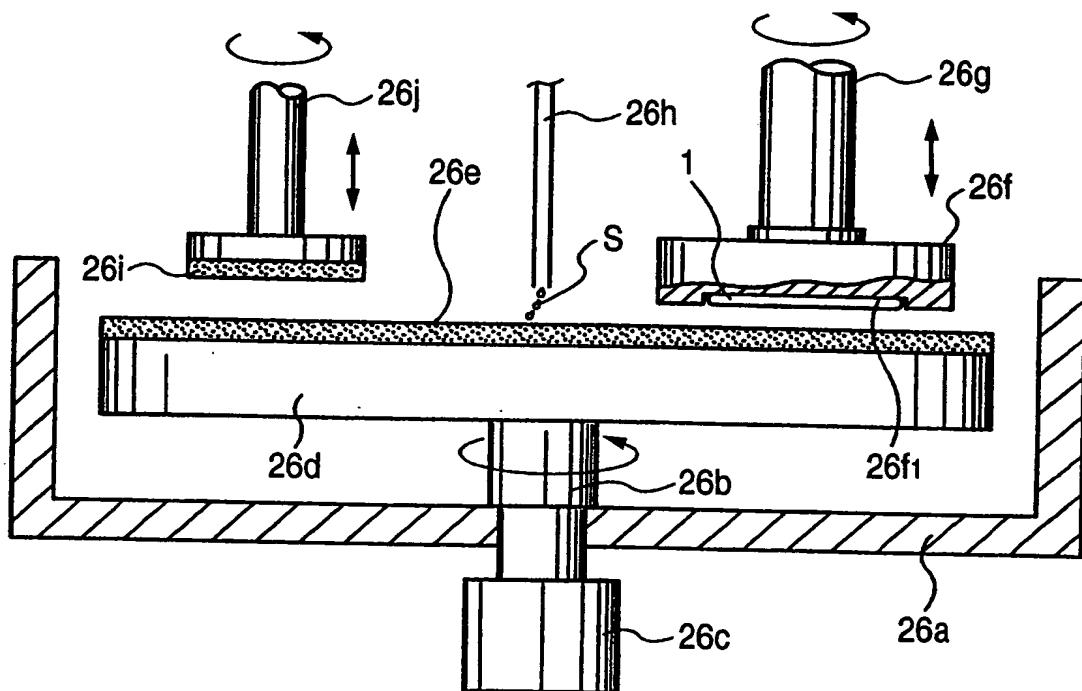
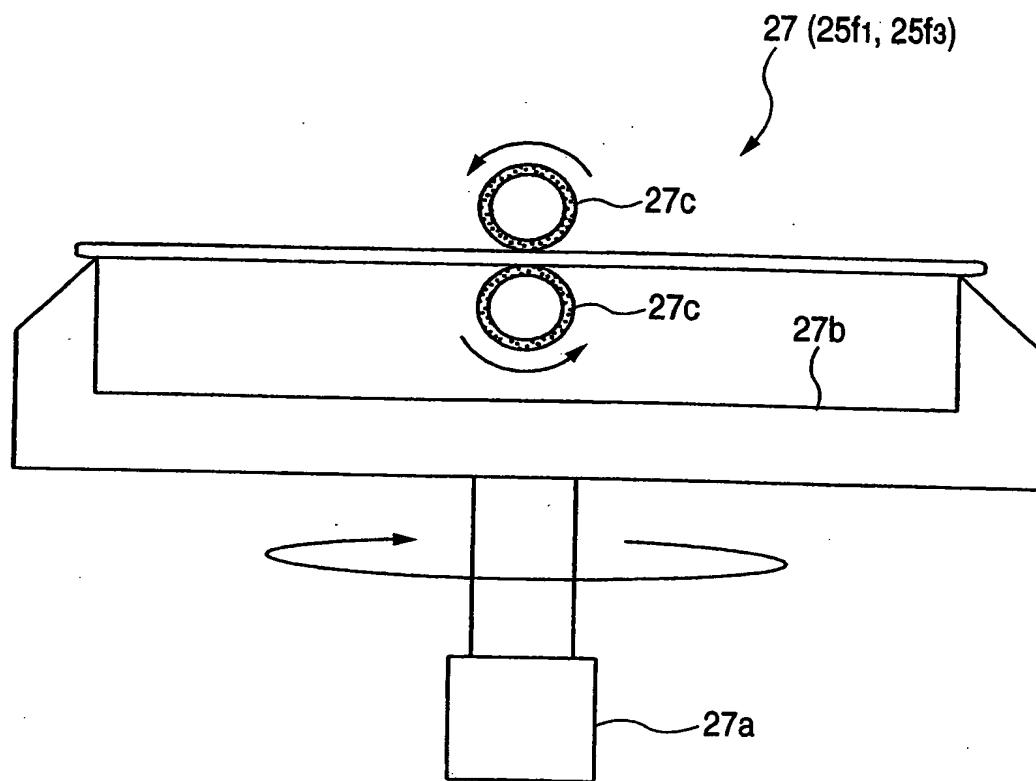


FIG. 38



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FIG. 39

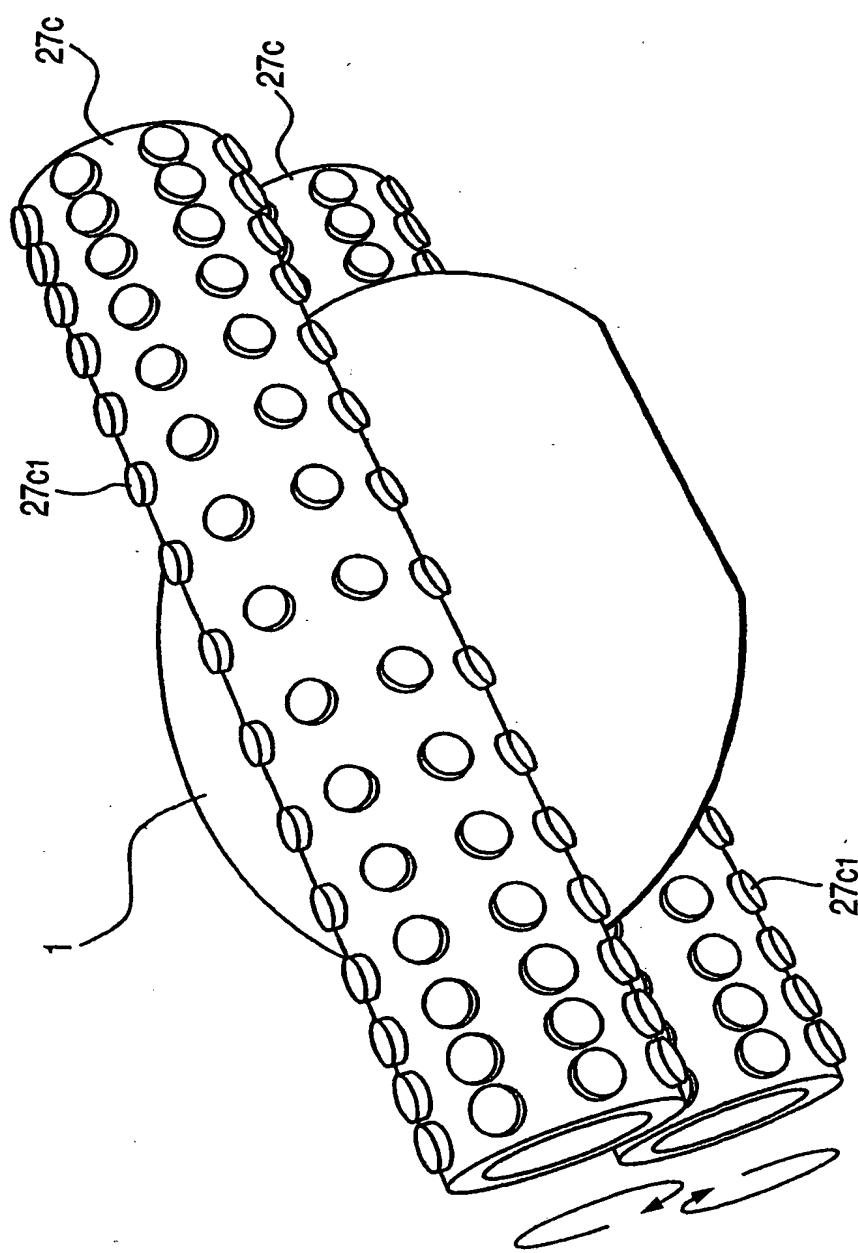


FIG. 40 (a)

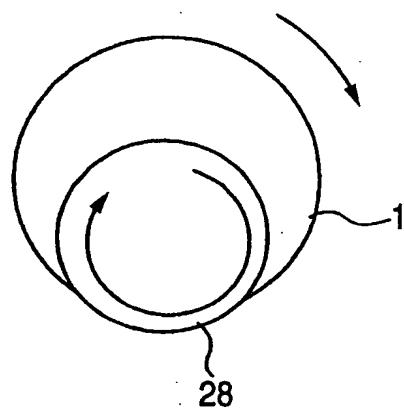


FIG. 40 (b)

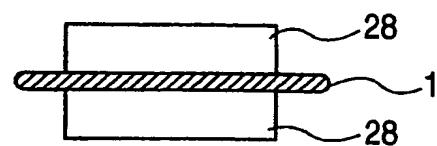


FIG. 41 (a)

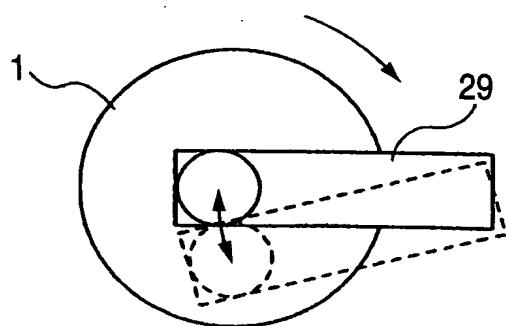


FIG. 41 (b)

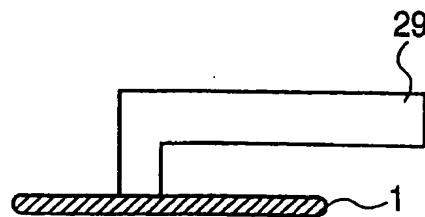


FIG. 42 (a)

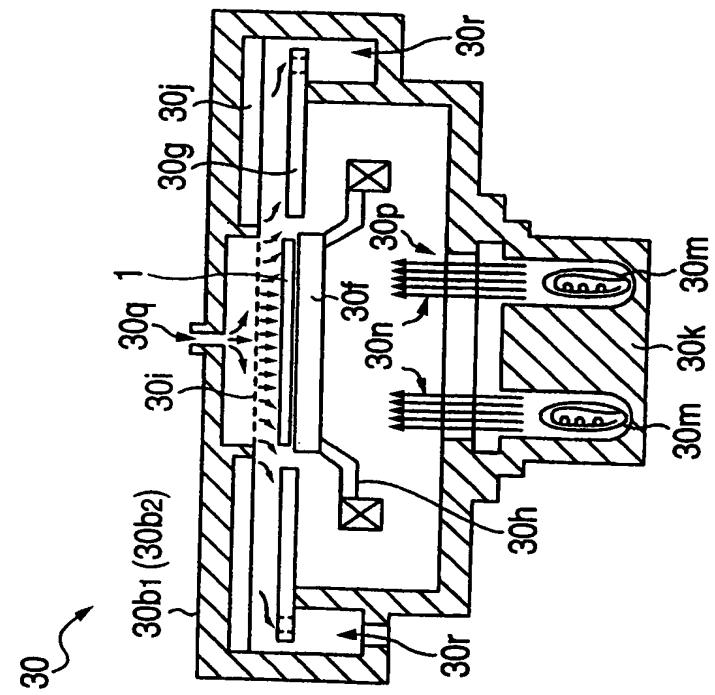


FIG. 42 (b)

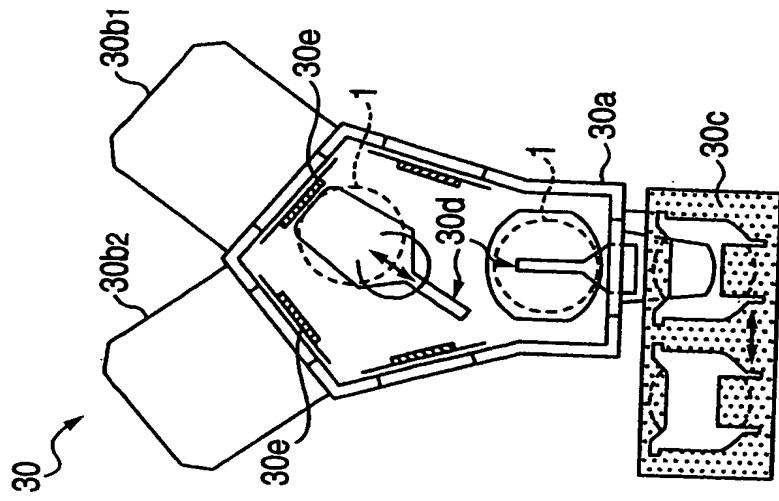


FIG. 43

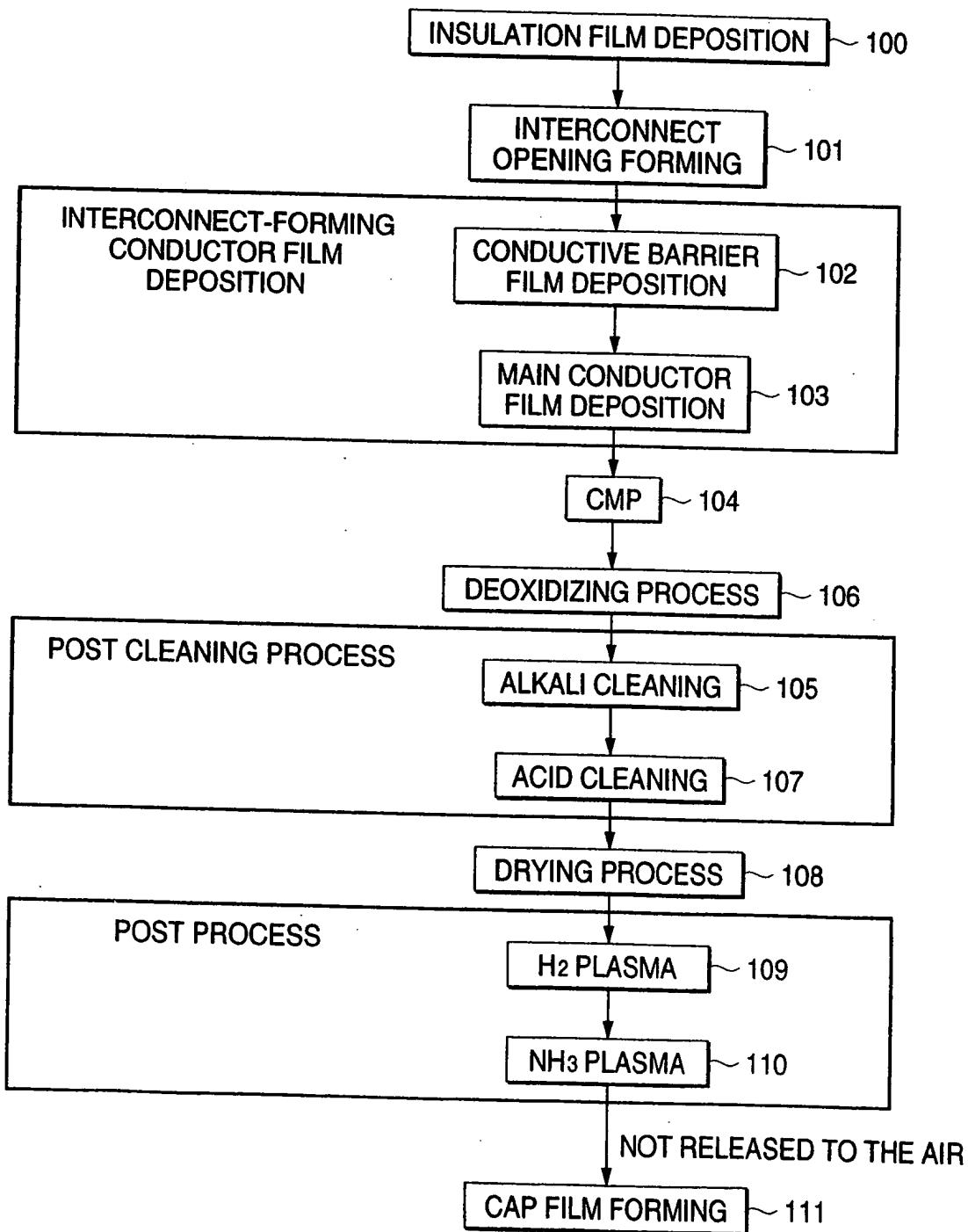
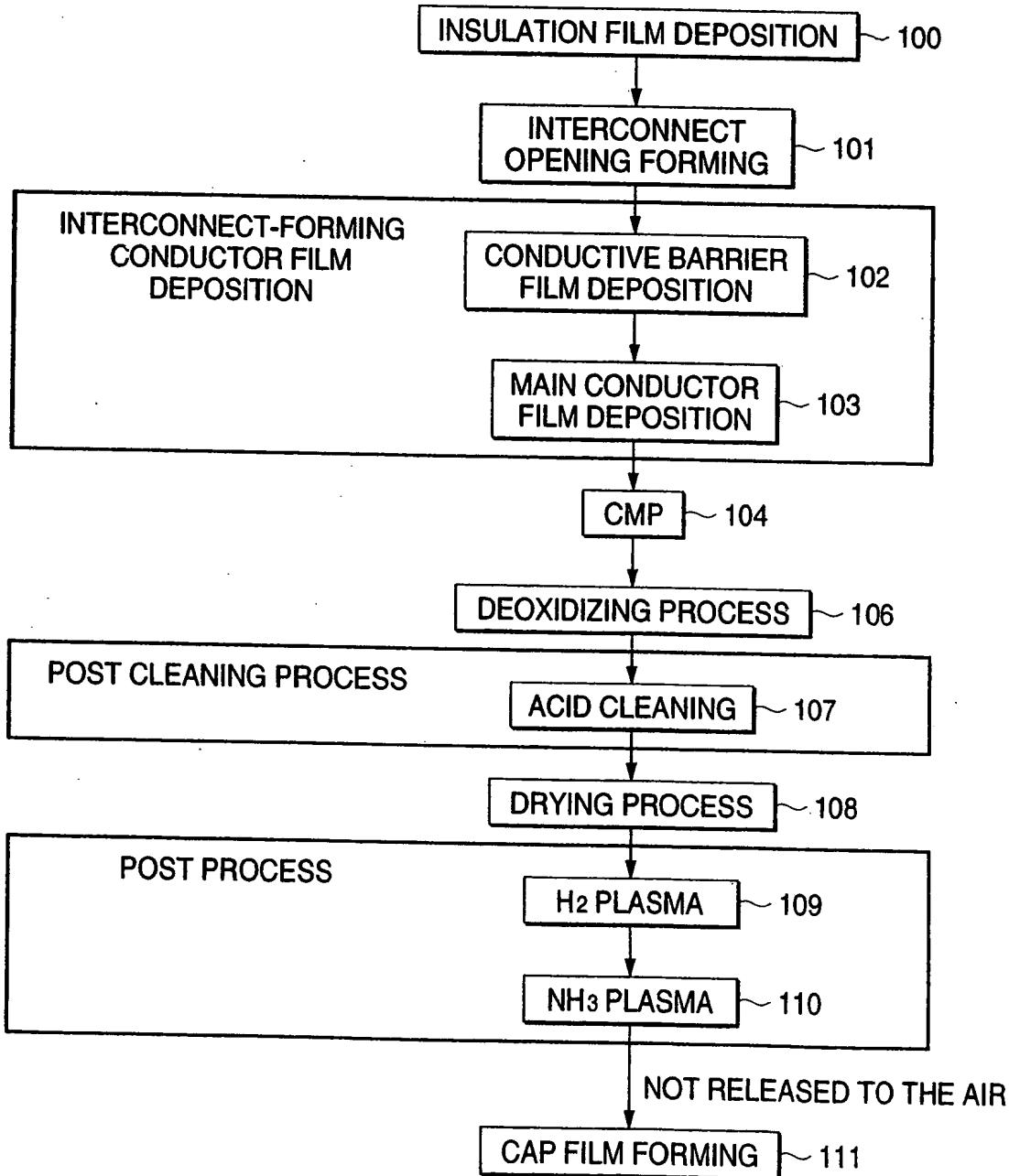


FIG. 44



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FIG. 45

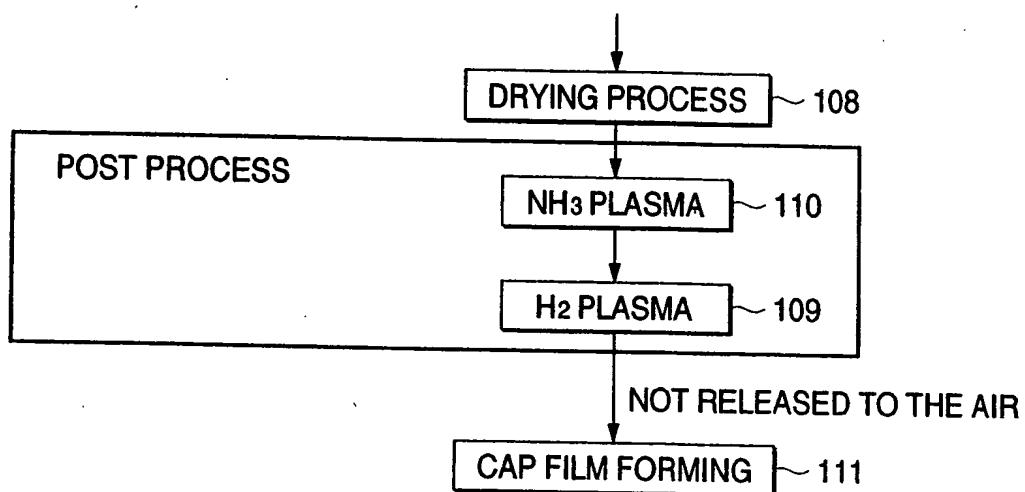
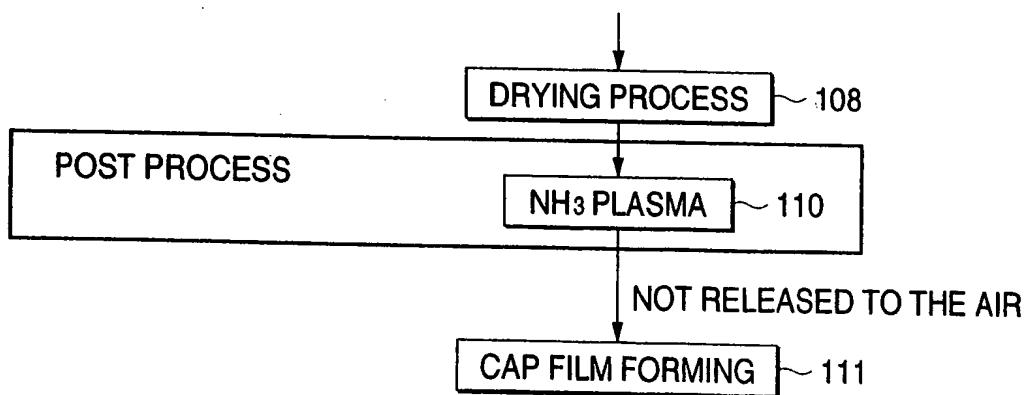


FIG. 46



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FIG. 47

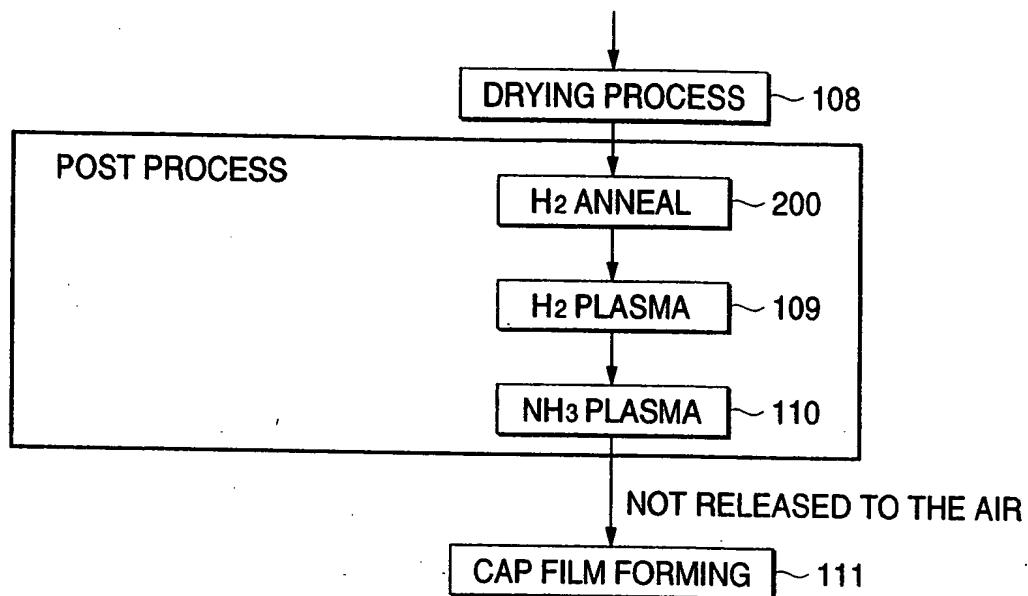


FIG. 48

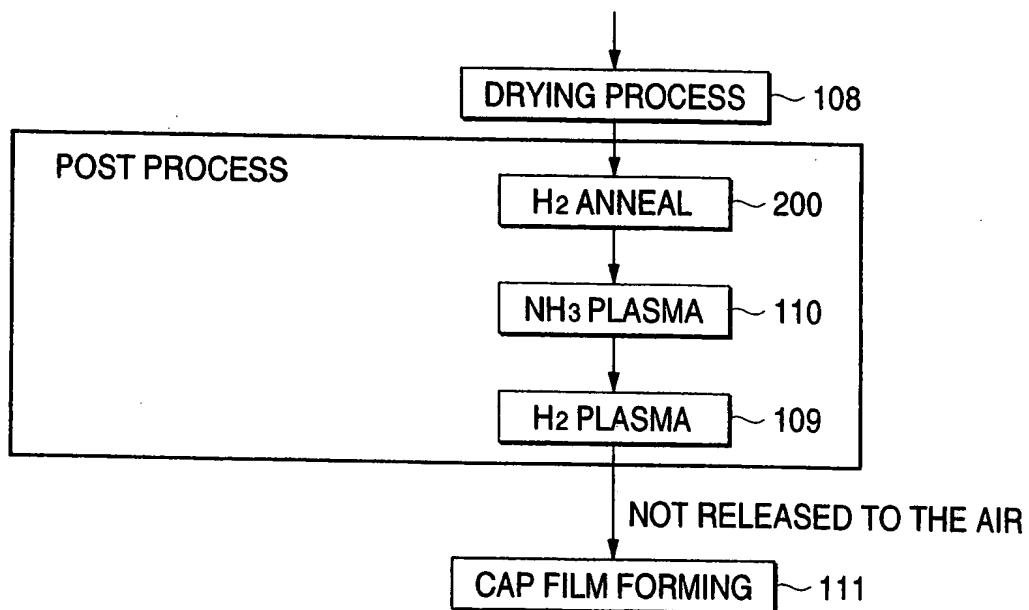


FIG. 49

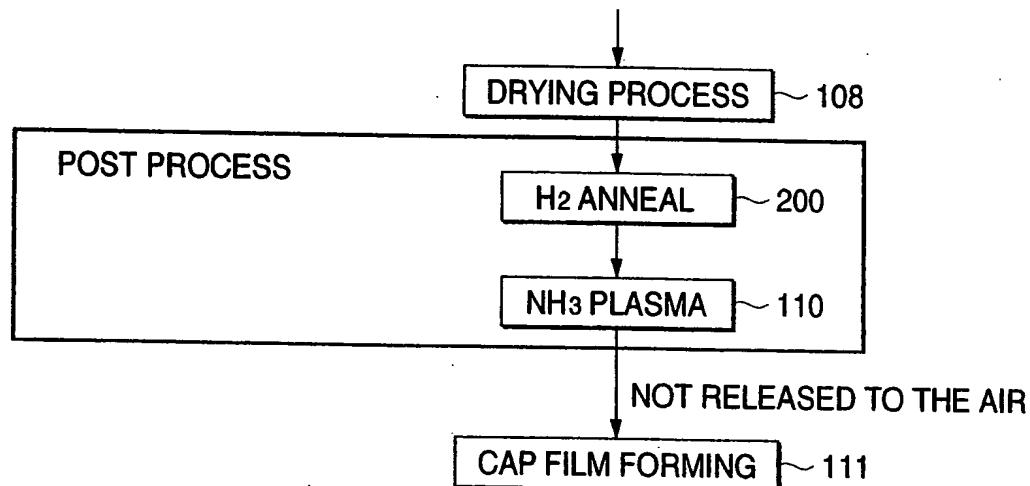
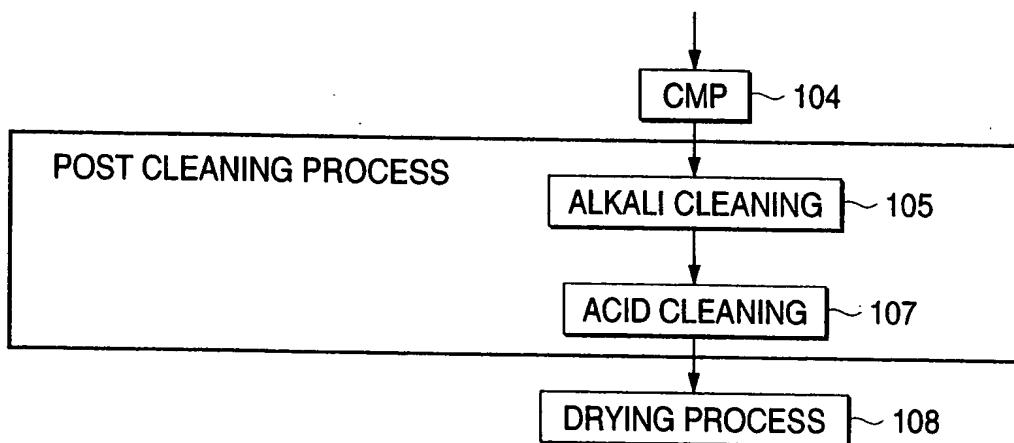


FIG. 50



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FIG. 51

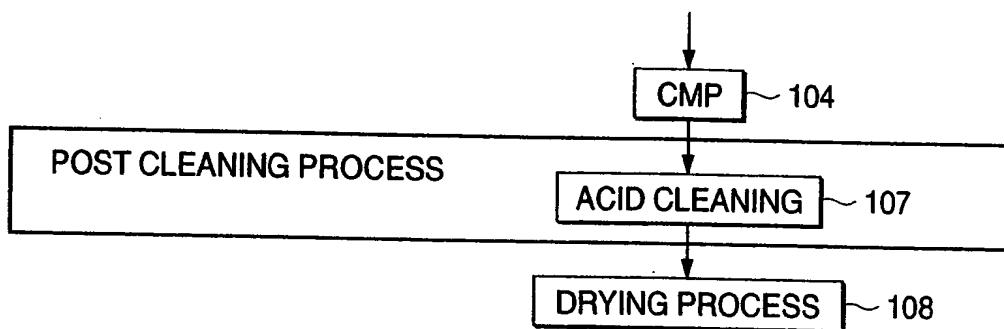


FIG. 52

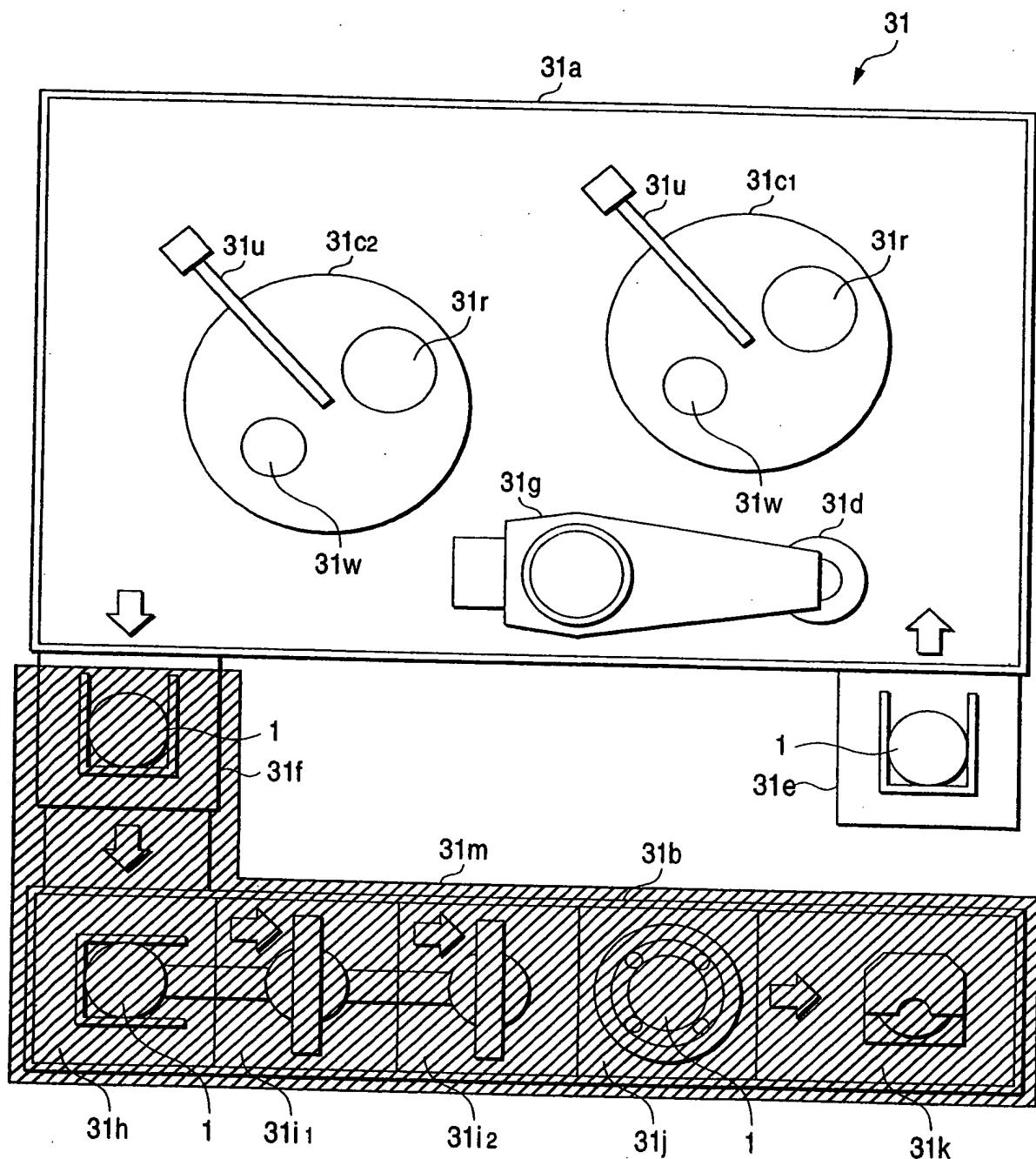


FIG. 53

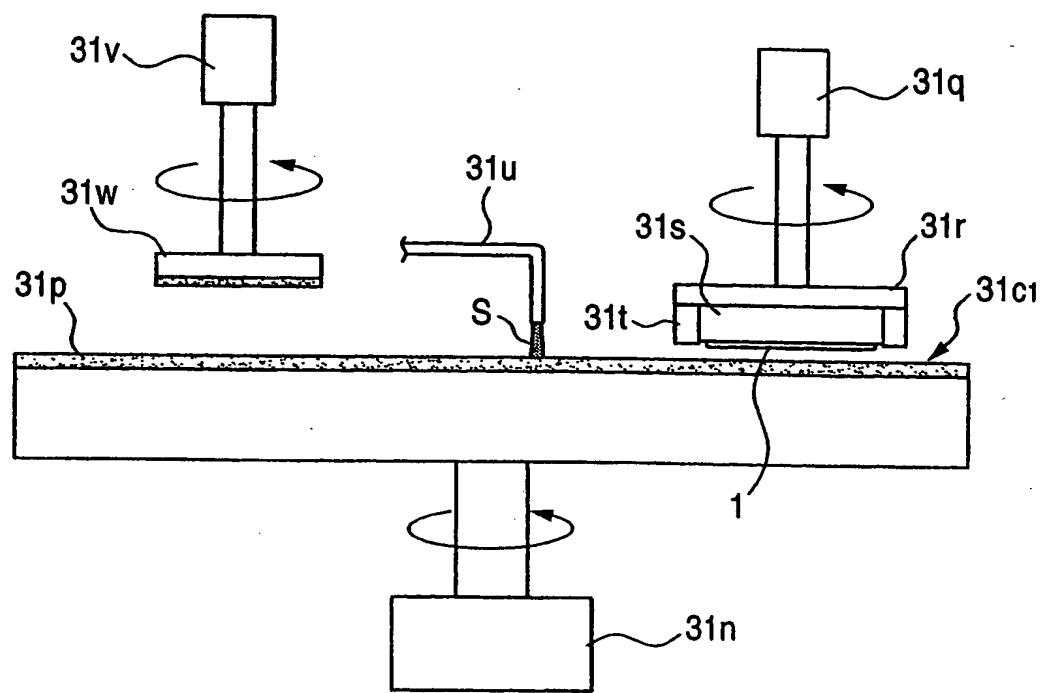


FIG. 54

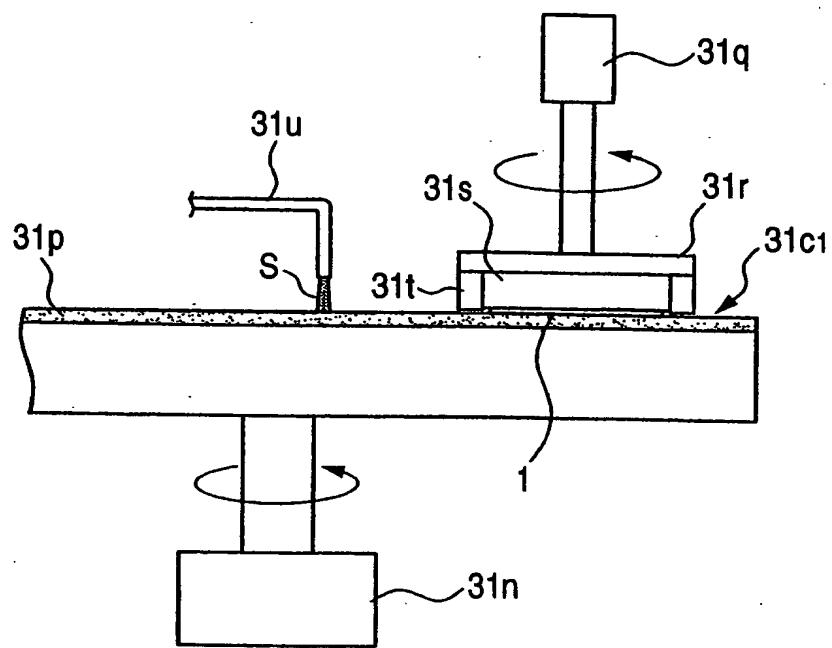


FIG. 55

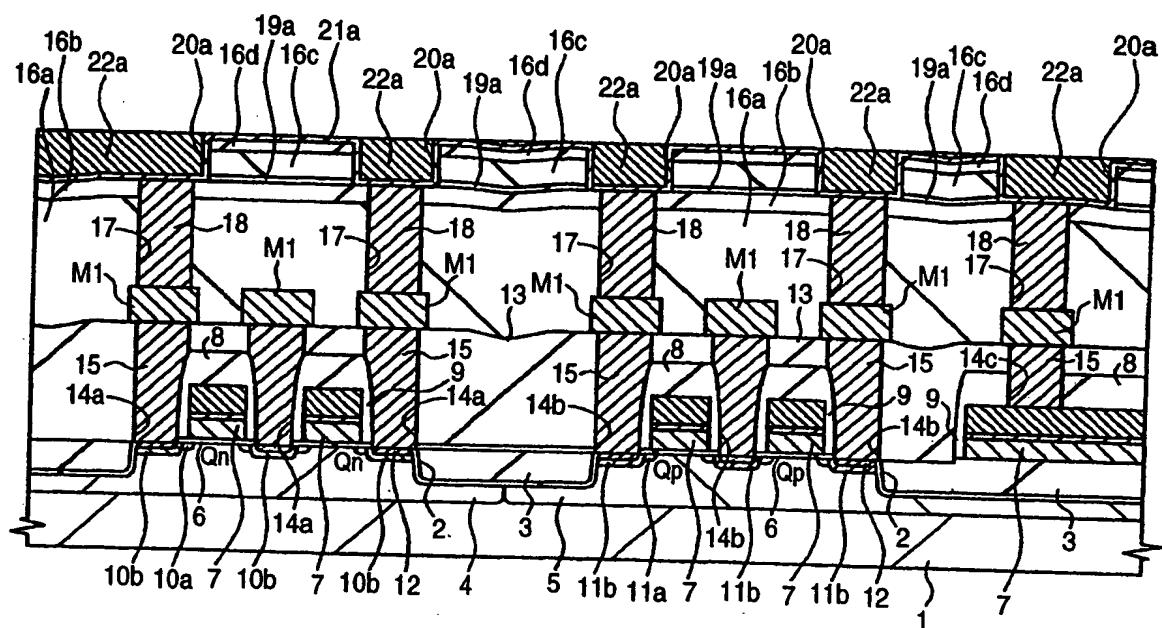


FIG. 56 (a)

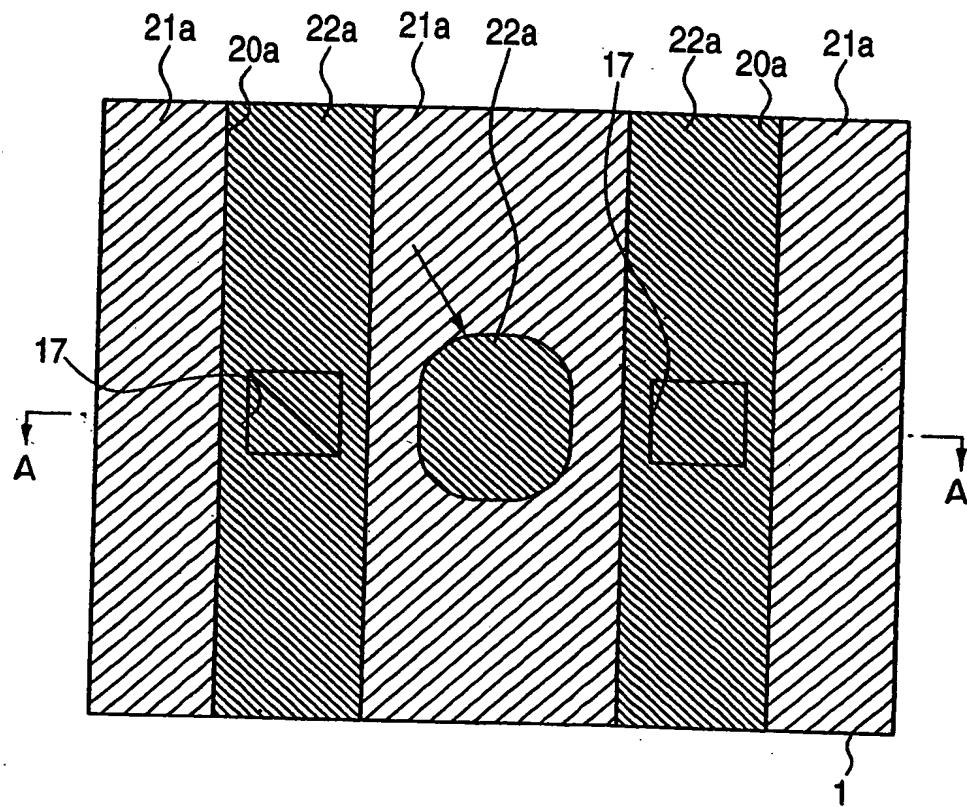


FIG. 56 (b)

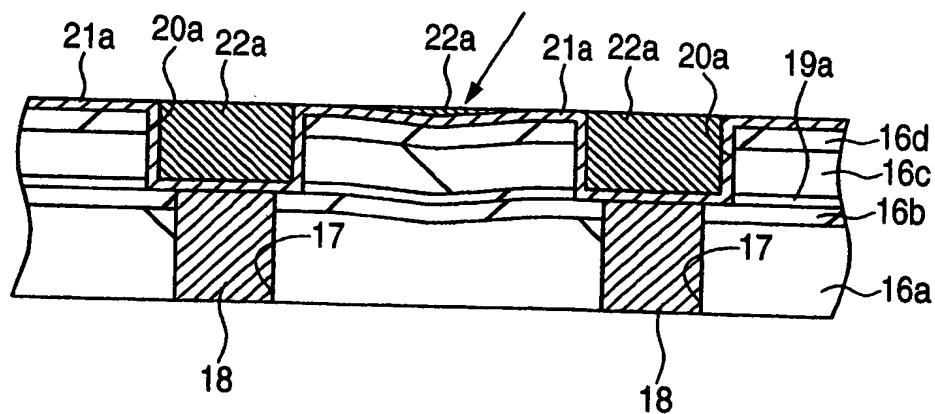


FIG. 57

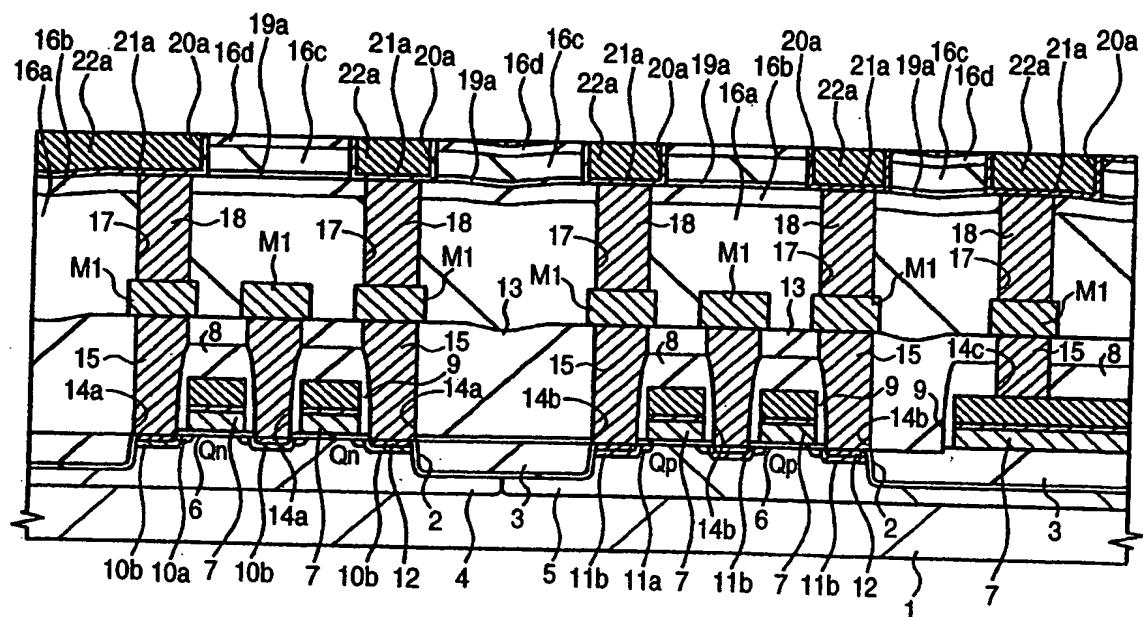


FIG. 58 (a)

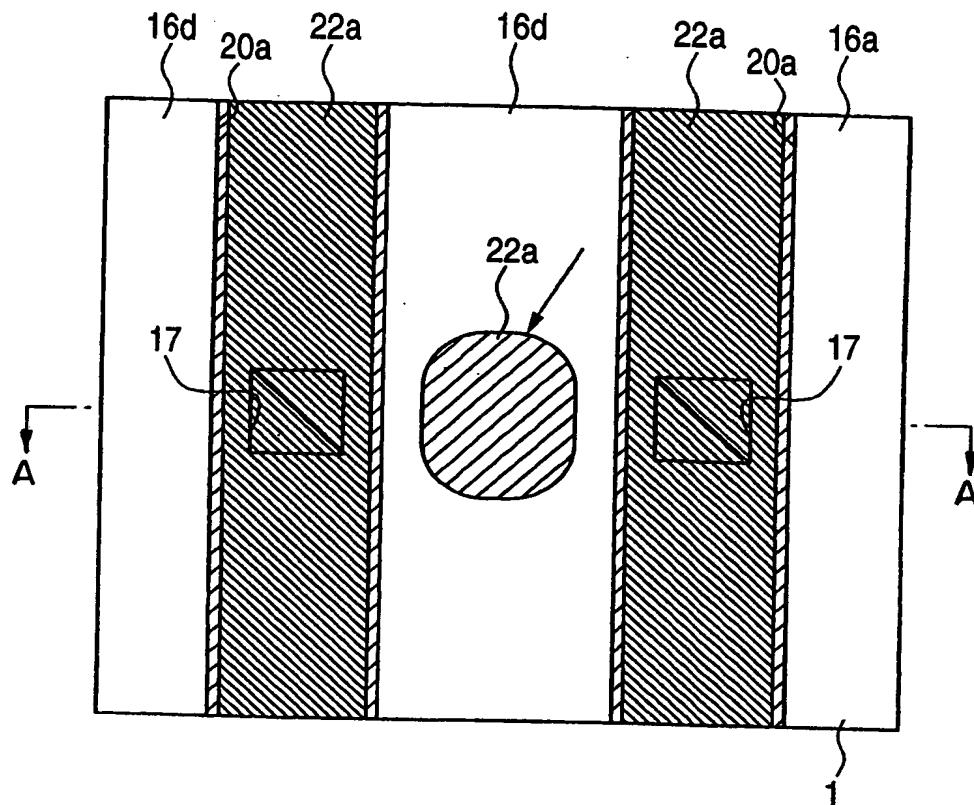


FIG. 58 (b)

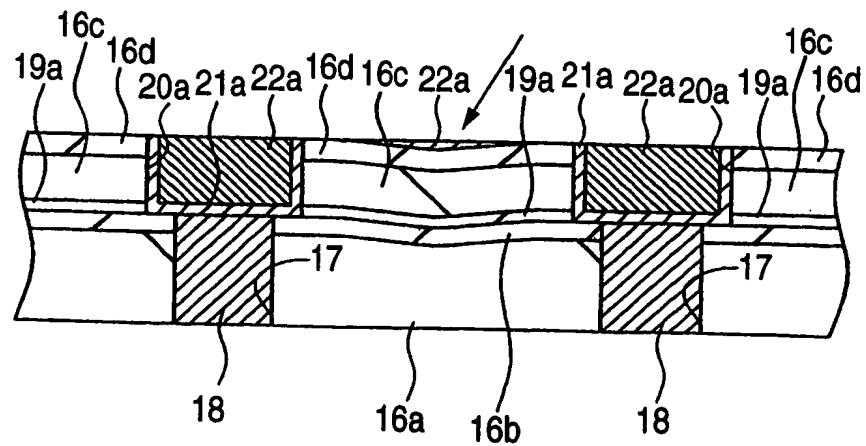


FIG. 59

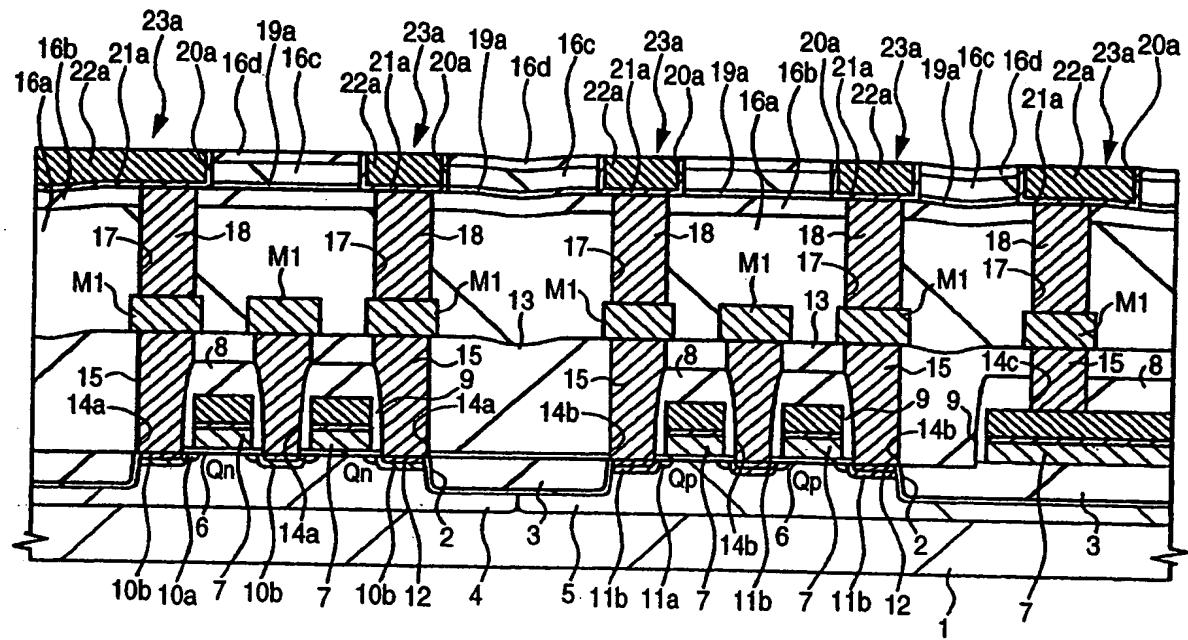


FIG. 60 (a)

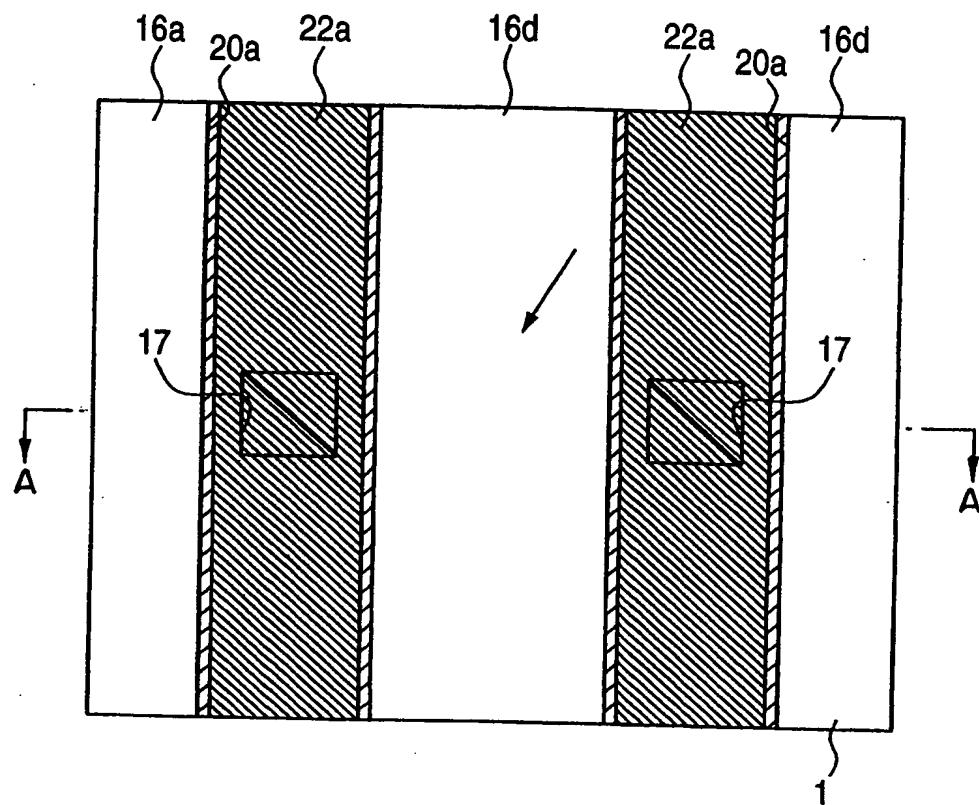


FIG. 60 (b)

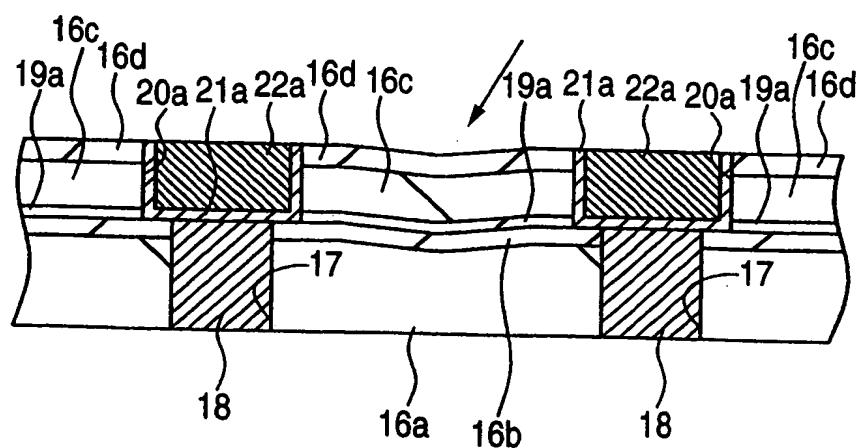


FIG. 61

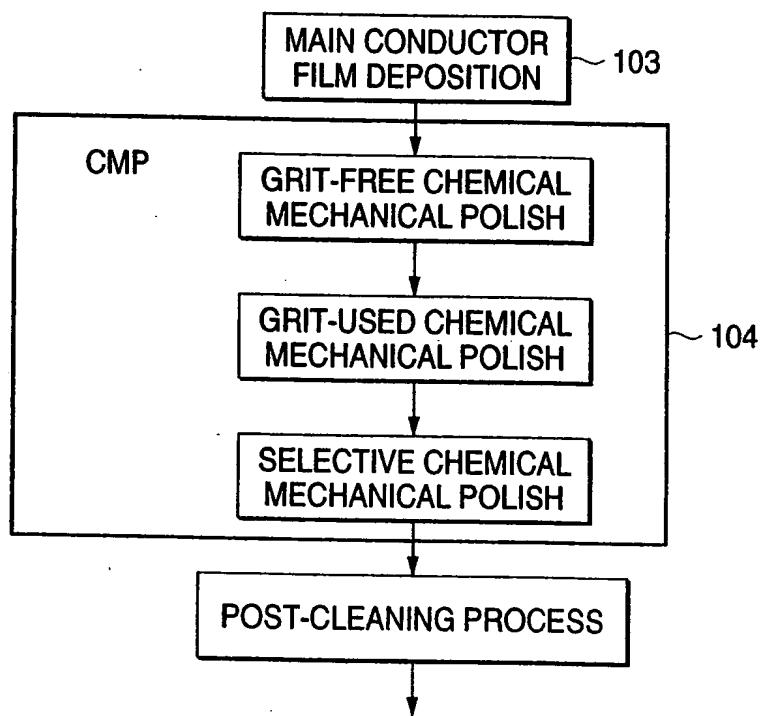
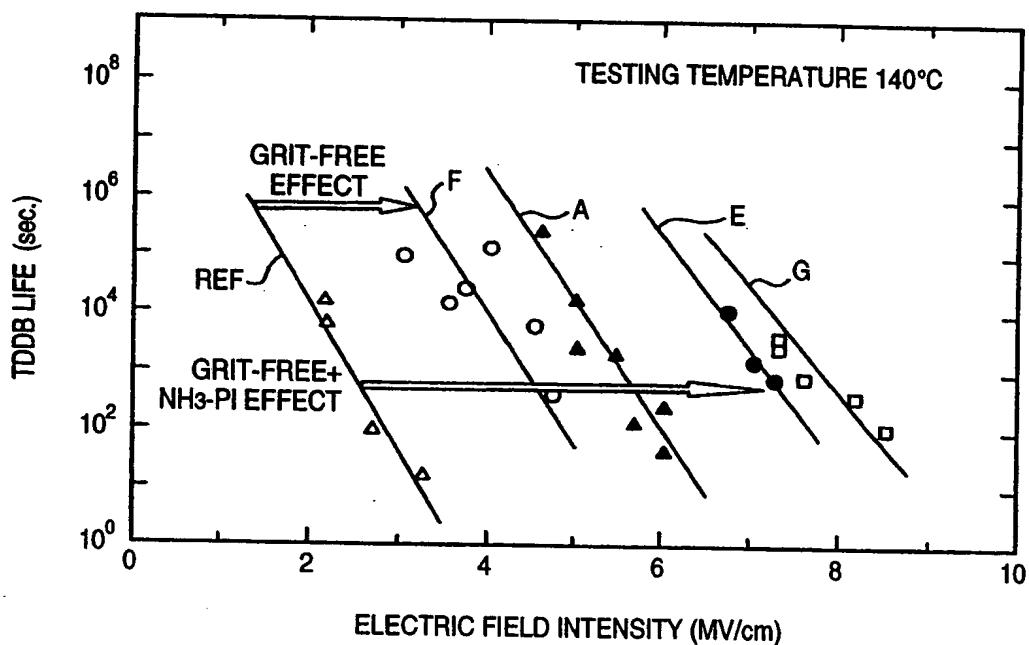
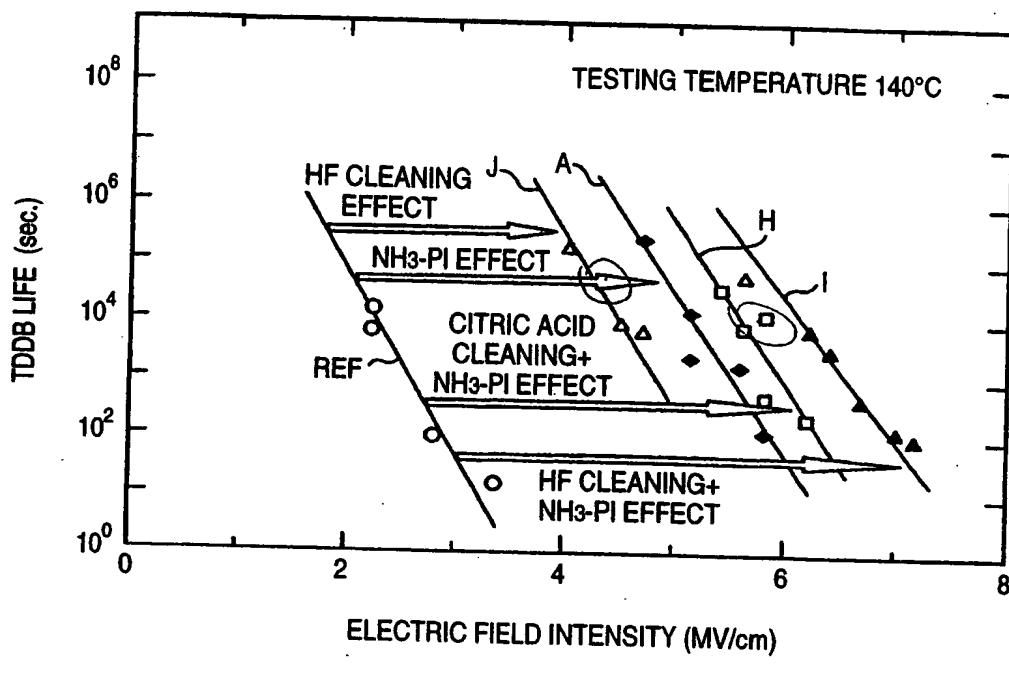


FIG. 62



△ : NO QCTT → NH₃+PI.
 ▲ : QCTT → NH₃+PI. PRESENT
 ○ : NO HS4000 → NH₃+PI.
 ● : HS4000 → NH₃+PI. PRESENT
 □ : HS4000 → NH₃+PI. PRESENT
 (HF CLEANING)

FIG. 63



○ : NO NH ₄ OH CLEANING → NH ₃ -PI
△ : NO HF CLEANING → NH ₃ -PI
◆ : NH ₄ OH CLEANING → NH ₃ -PI PRESENT
□ : CITRIC ACID CLEANING → NH ₃ -PI PRESENT
▲ : HF CLEANING → NH ₃ -PI PRESENT

FIG. 64

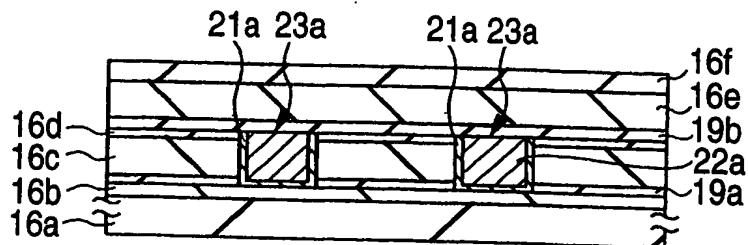


FIG. 65 (a)

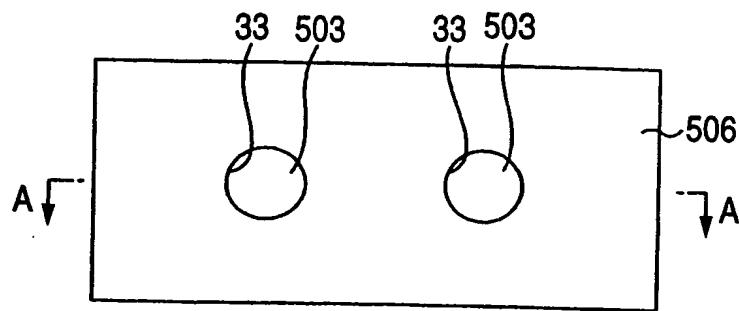


FIG. 65 (b)

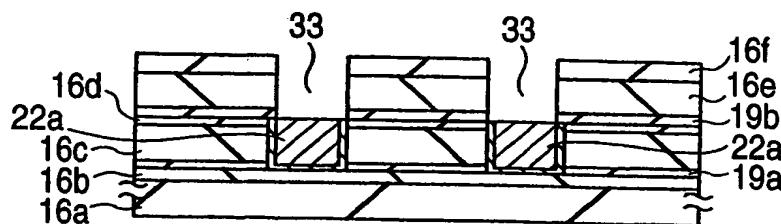


FIG. 66

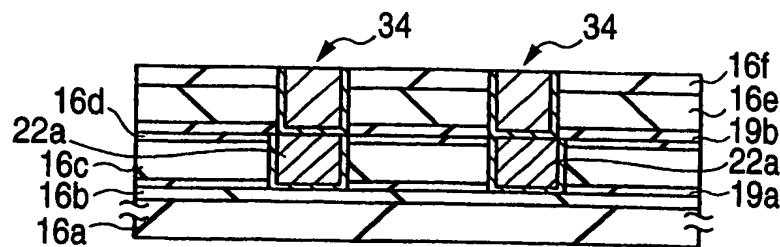


FIG. 67

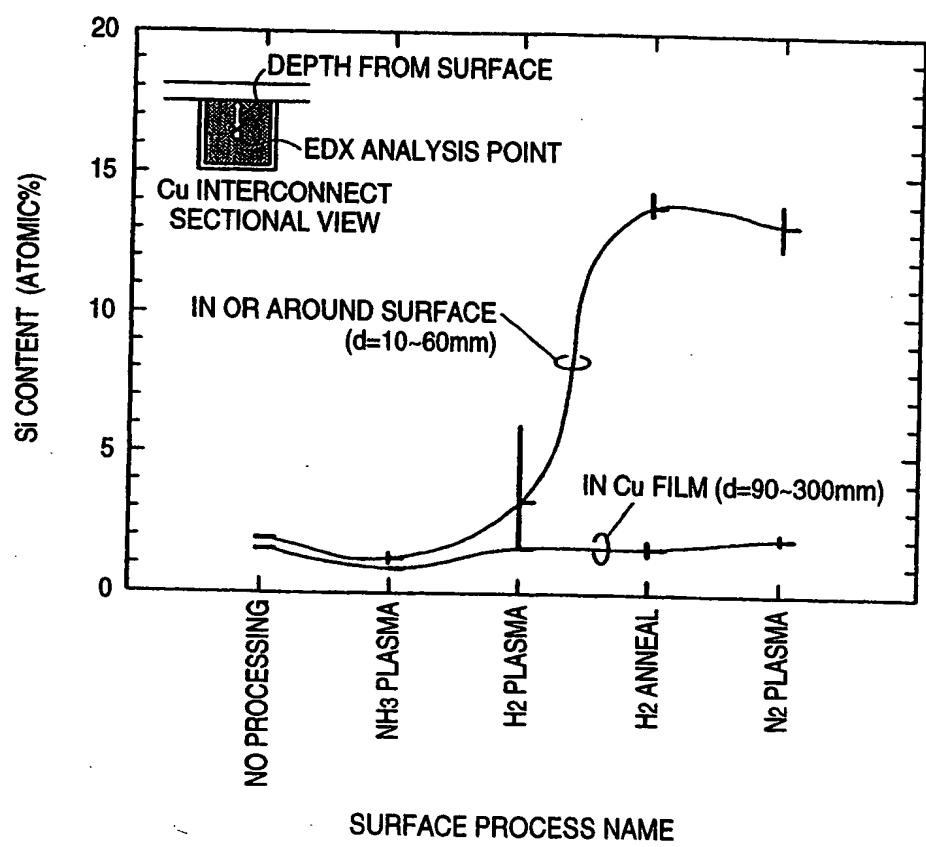
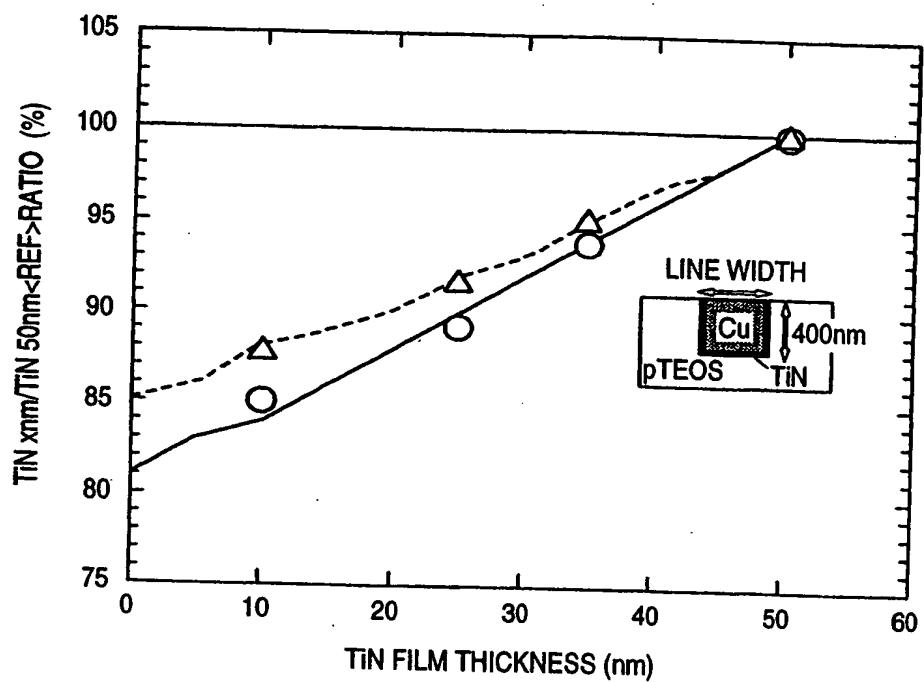


FIG. 68



* TiN FILM THICKNESS=TRENCH-BOTTOM FILM THICKNESS

- | | |
|-------|--|
| ○ | : LINE WIDTH 0.4μm (MEASUREMENT VALUE) |
| △ | : LINE WIDTH 1.0μm (MEASUREMENT VALUE) |
| — | : LINE WIDTH 0.4μm (CALCULATED VALUE) |
| - - - | : LINE WIDTH 1.0μm (CALCULATED VALUE) |

FIG. 69

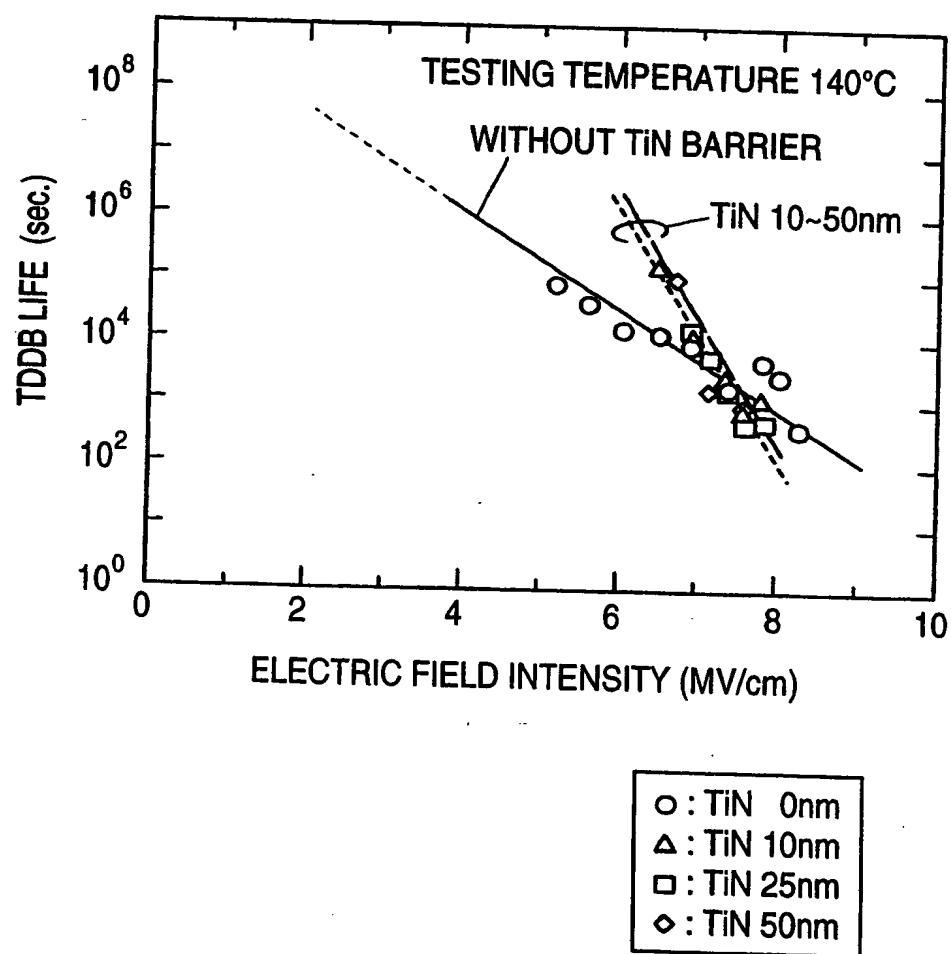
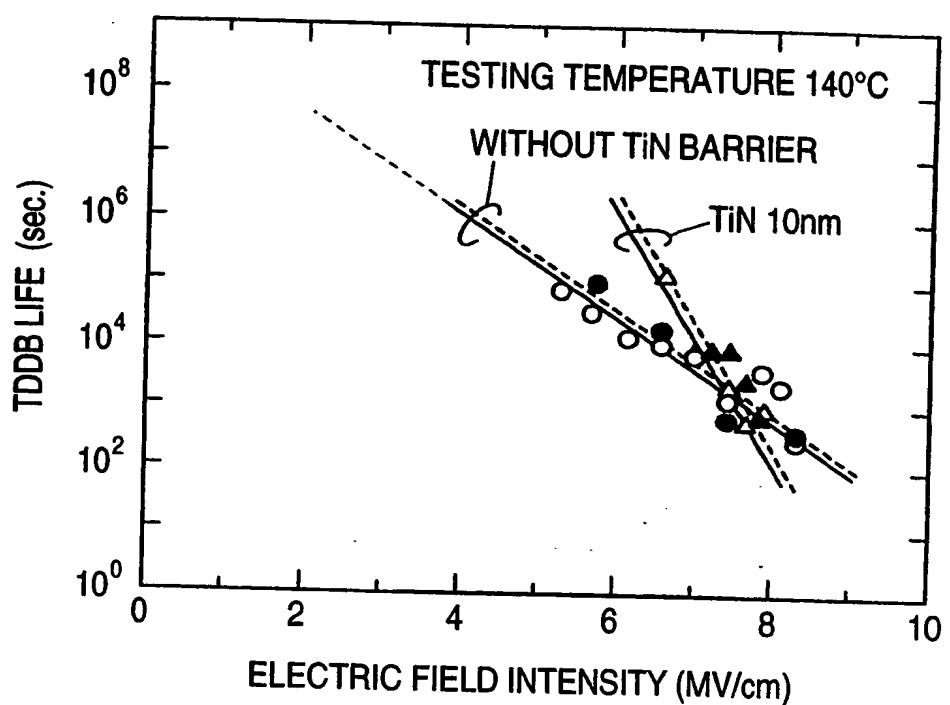


FIG. 70



—○— : TiN 0nm
—△— : TiN 10nm
-●- : TiN 0nm (400°C 3HOURS N ₂ ANNEAL)
-▲- : TiN 10nm (400°C 3HOURS N ₂ ANNEAL)

FIG. 71 (a)

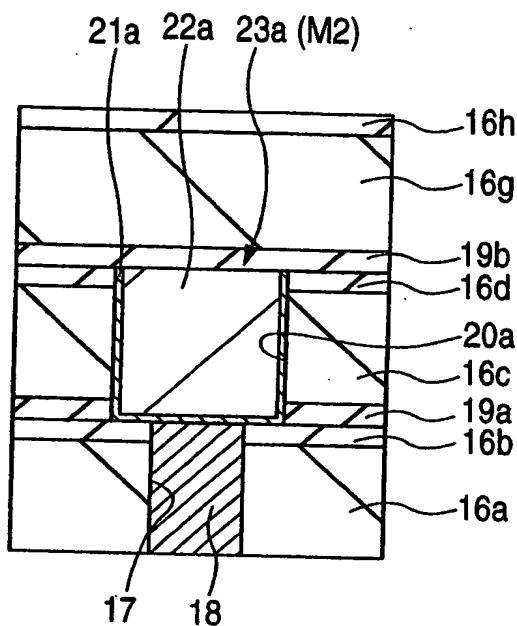


FIG. 71 (b)

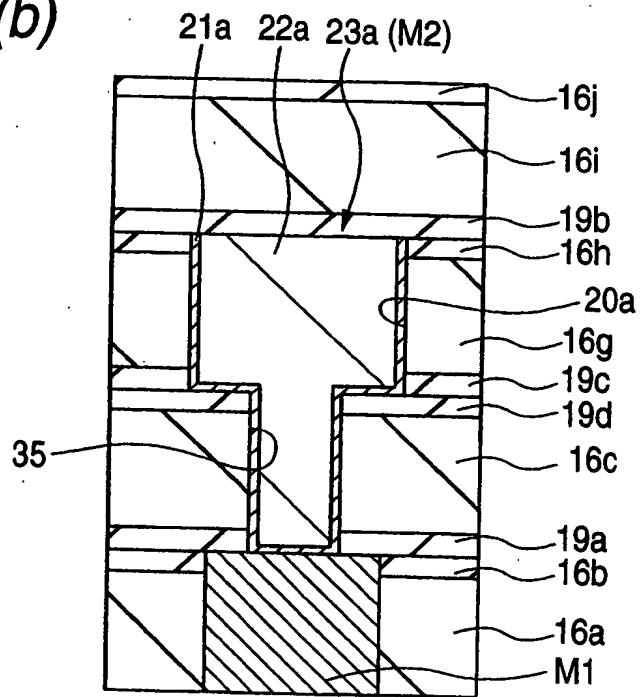


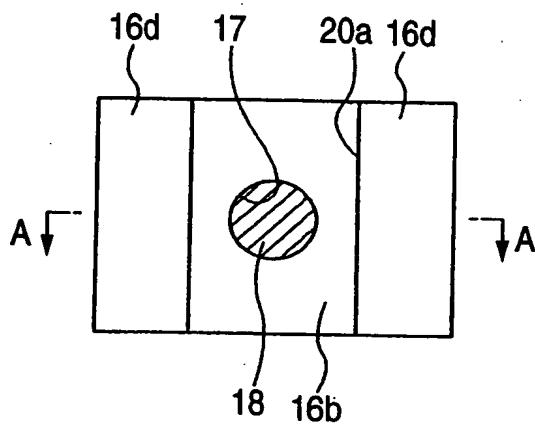
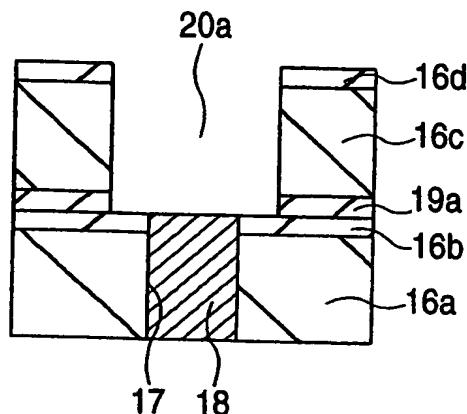
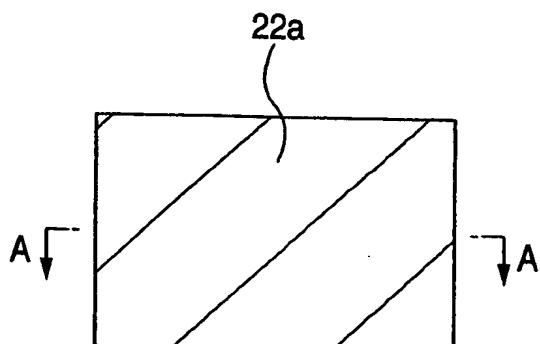
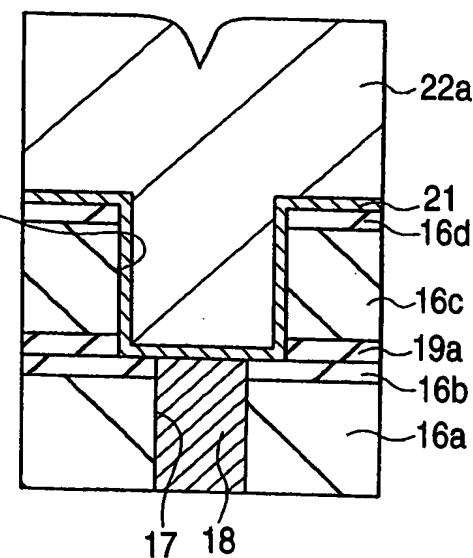
FIG. 72 (a)*FIG. 72 (b)**FIG. 73 (a)**FIG. 73 (b)*

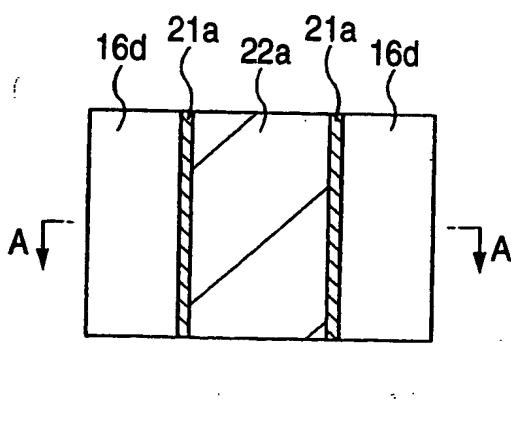
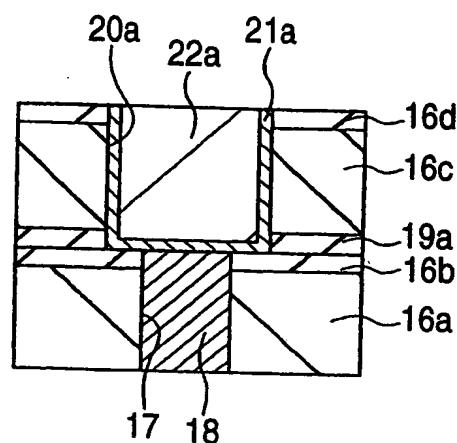
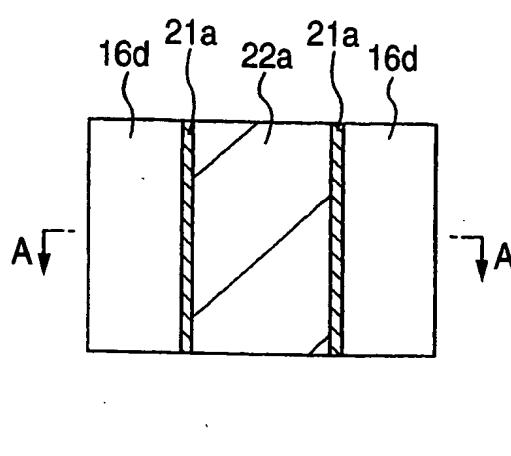
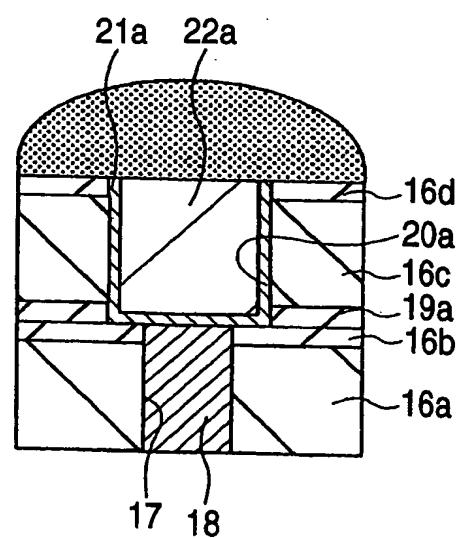
FIG. 74 (a)*FIG. 74 (b)**FIG. 75 (a)**FIG. 75 (b)*

FIG. 76 (a)

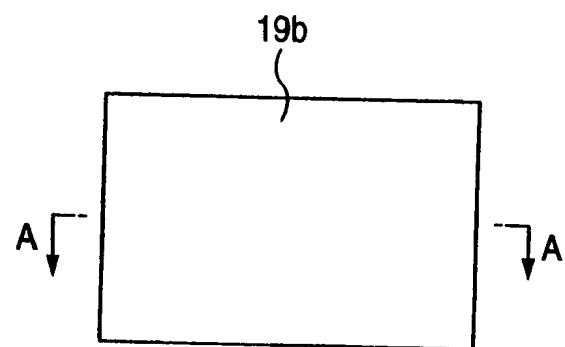


FIG. 76 (b)

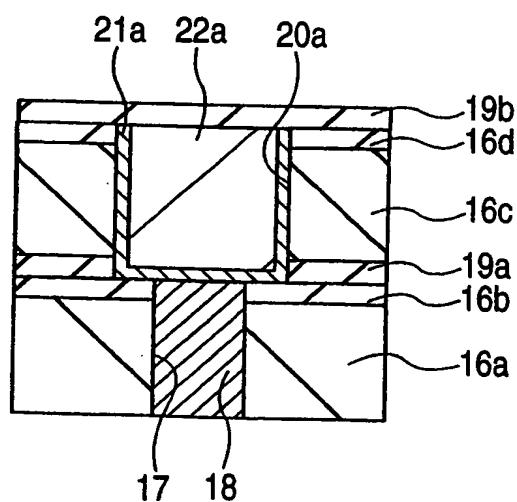


FIG. 77 (a)

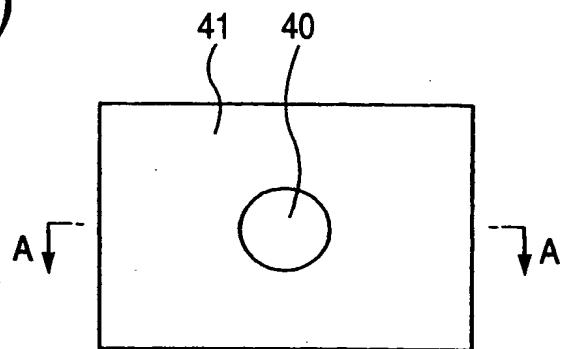


FIG. 77 (b)

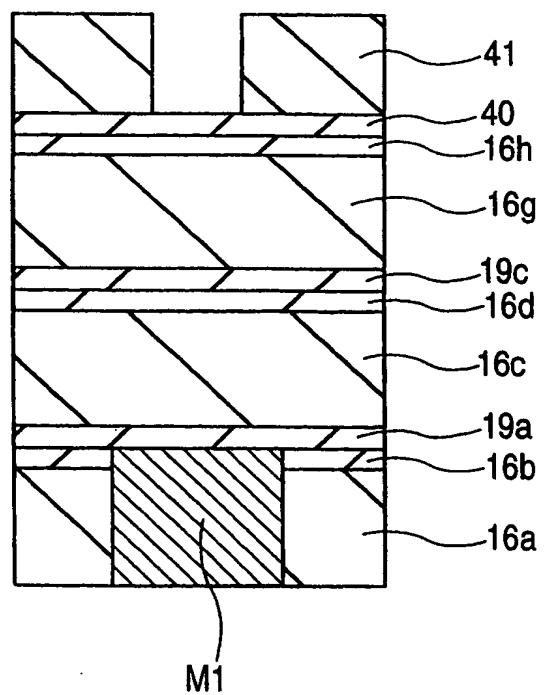


FIG. 78 (a)

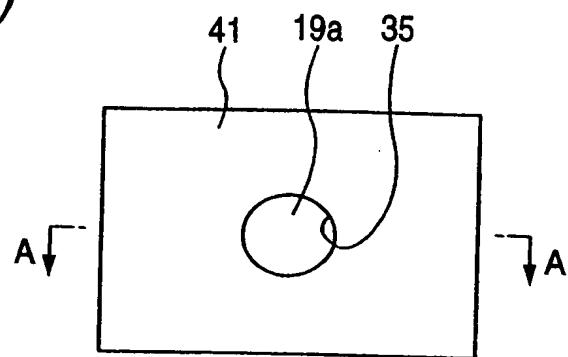


FIG. 78 (b)

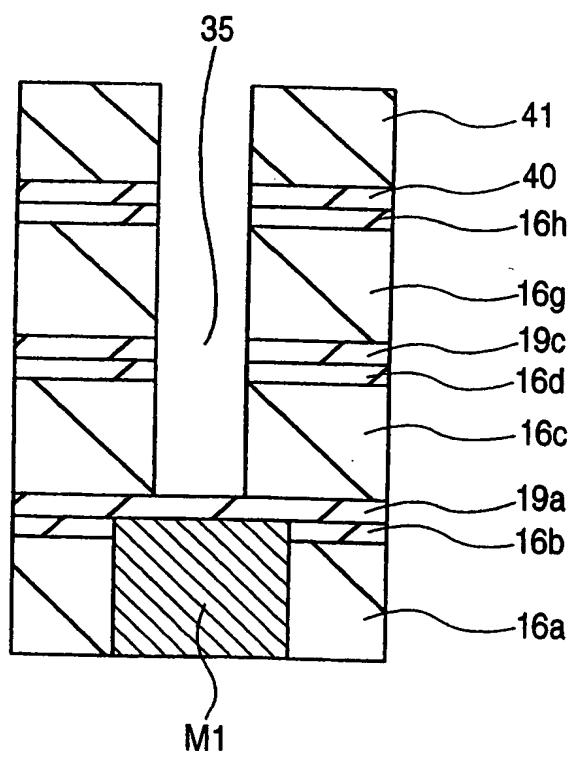


FIG. 79 (a)

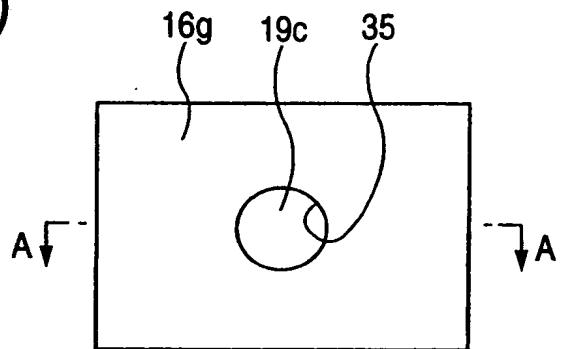


FIG. 79 (b)

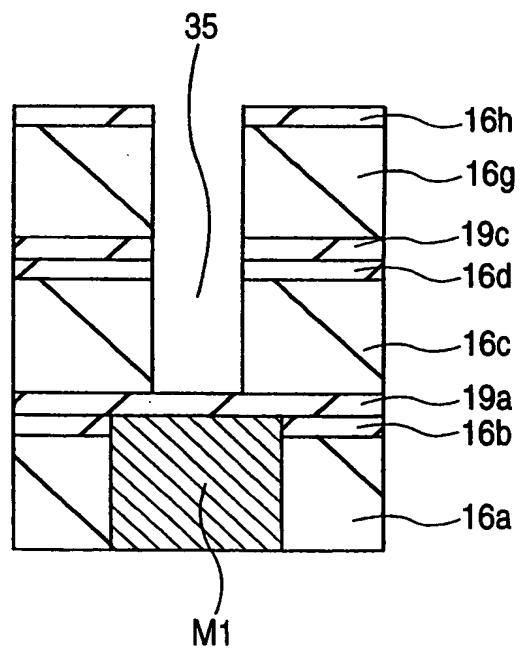


FIG. 80 (a)

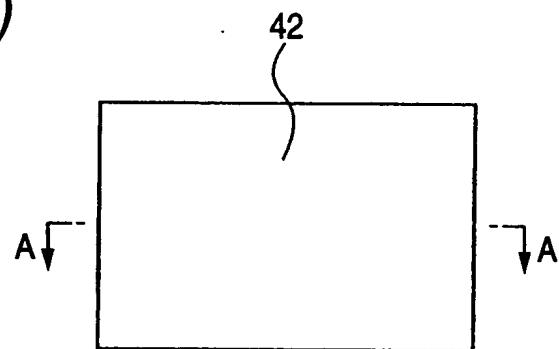


FIG. 80 (b)

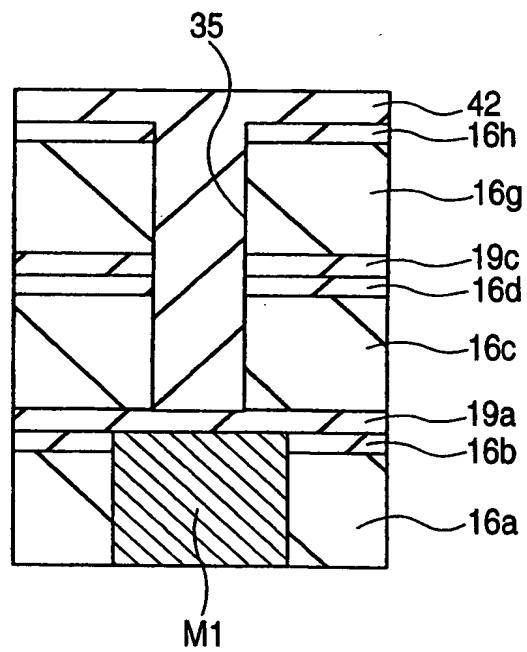


FIG. 81 (a)

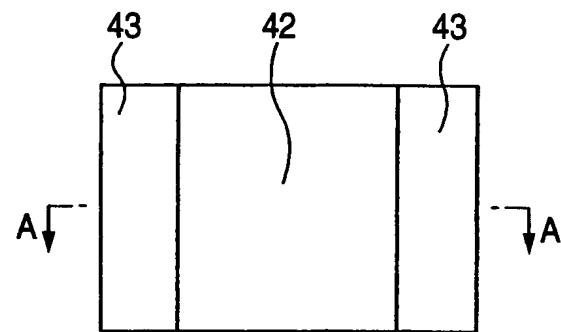


FIG. 81 (b)

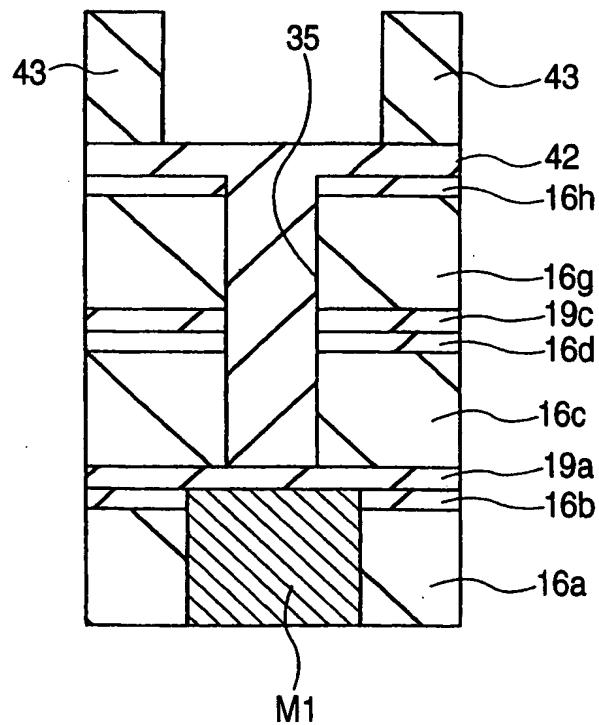


FIG. 82 (a)

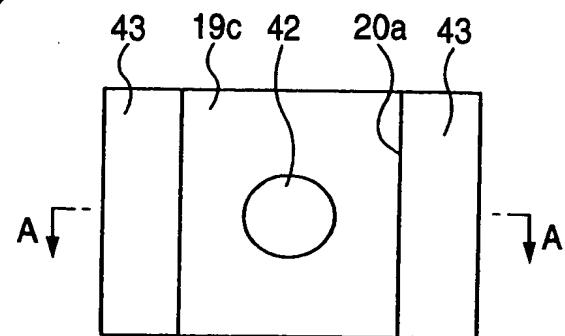


FIG. 82 (b)

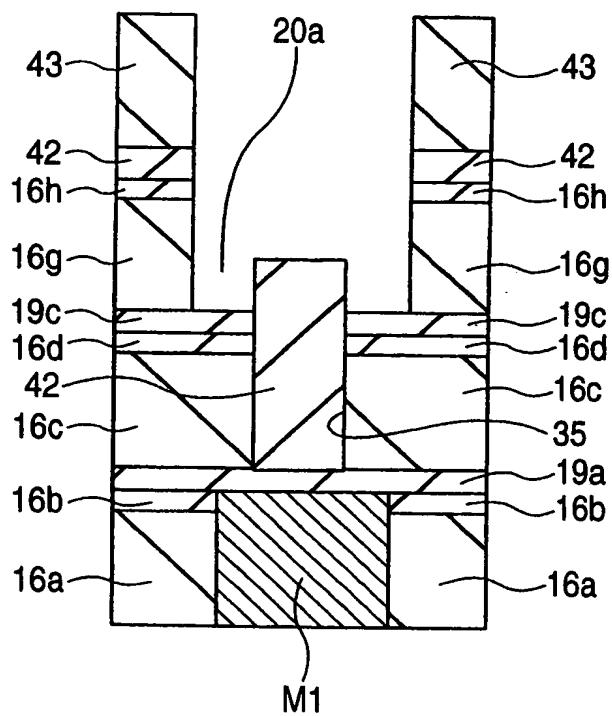


FIG. 83 (a)

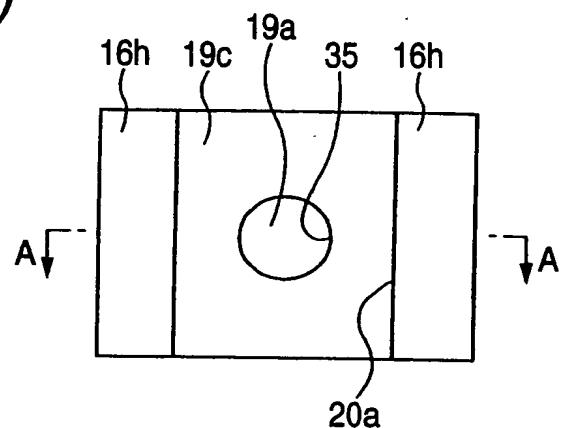


FIG. 83 (b)

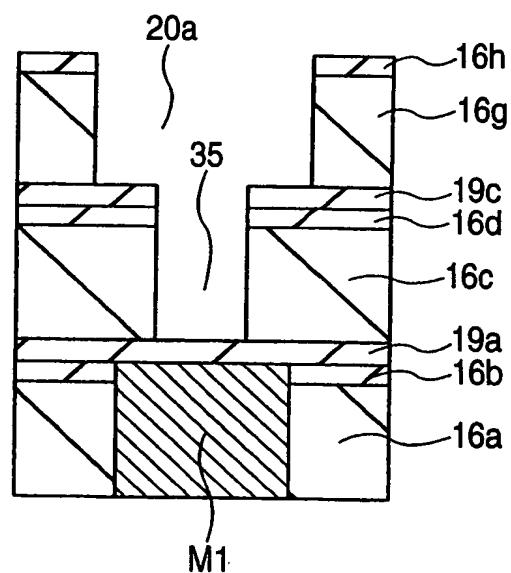


FIG. 84 (a)

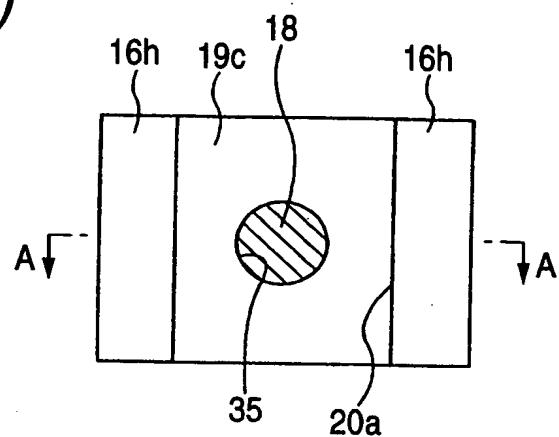


FIG. 84 (b)

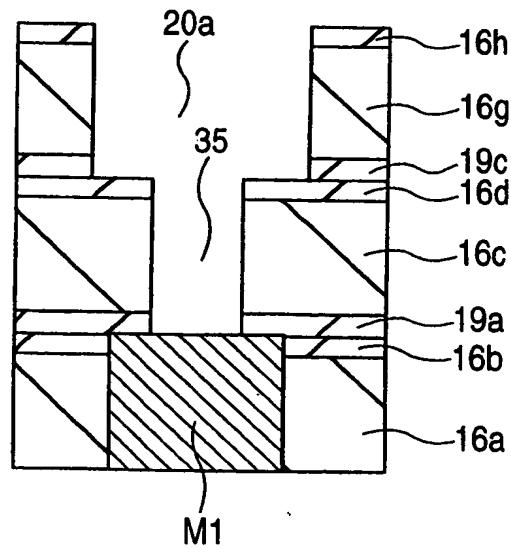


FIG. 85 (a)

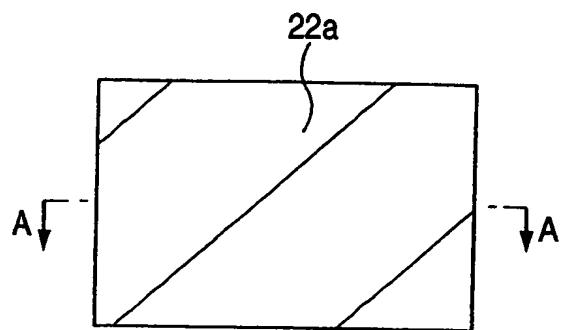


FIG. 85 (b)

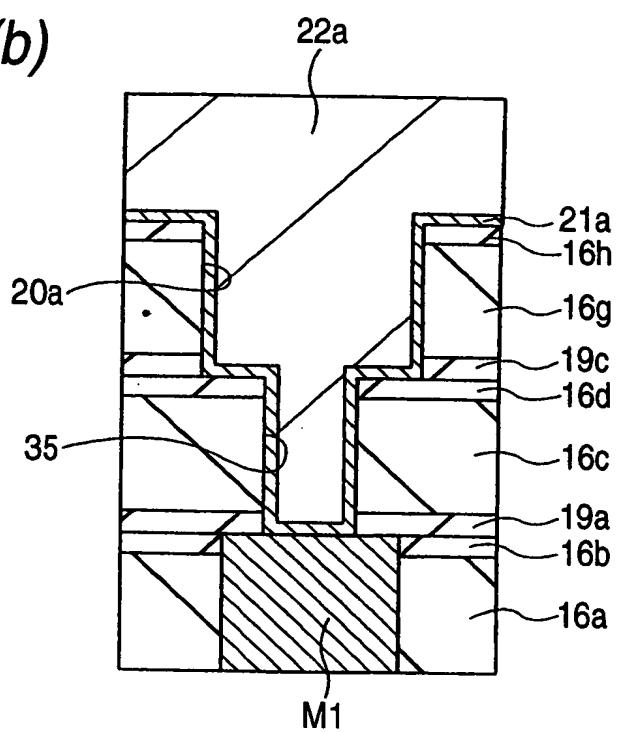


FIG. 86 (a)

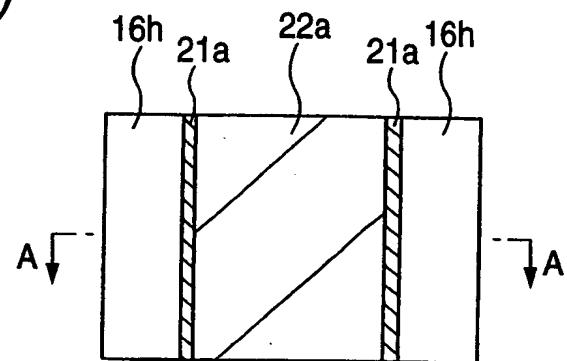


FIG. 86 (b)

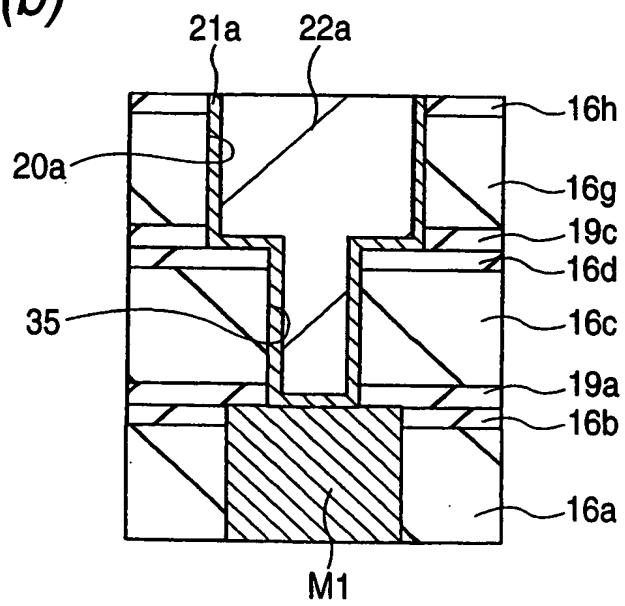


FIG. 87 (a)

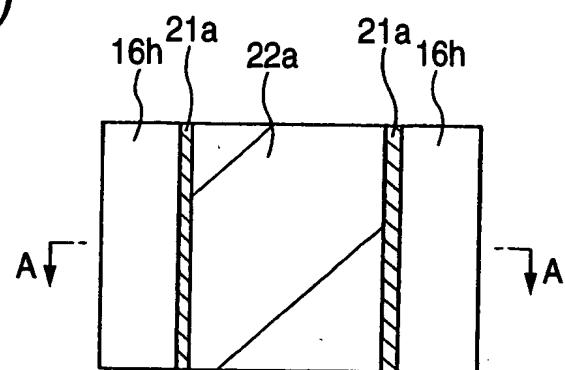


FIG. 87 (b)

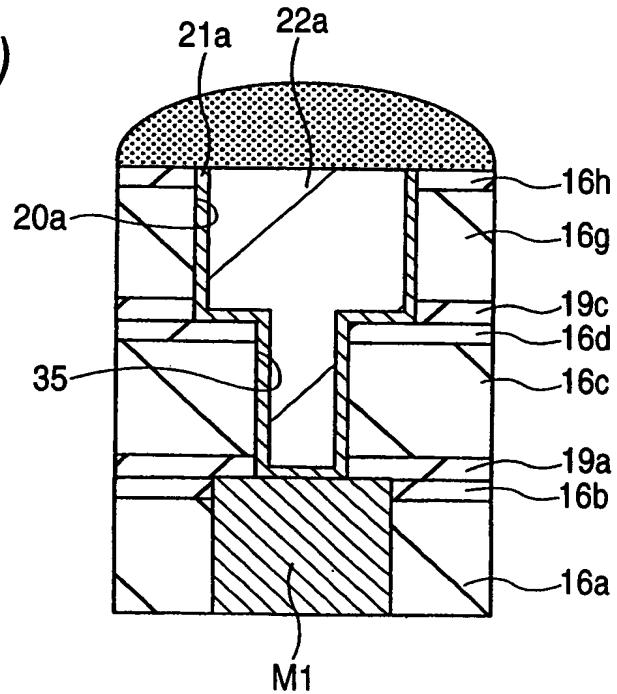


FIG. 88 (a)

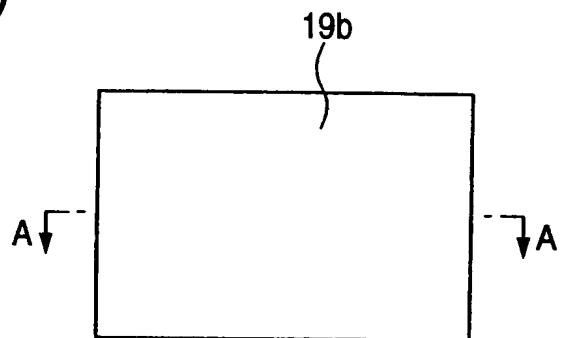


FIG. 88 (b)

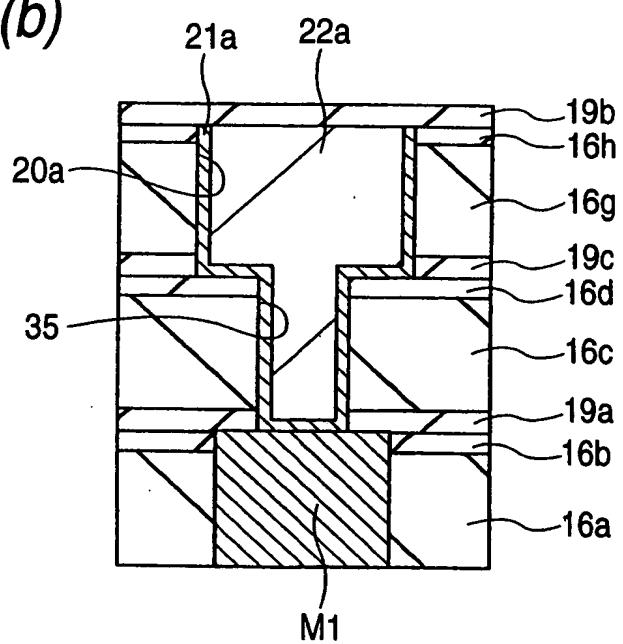


FIG. 89 (a)

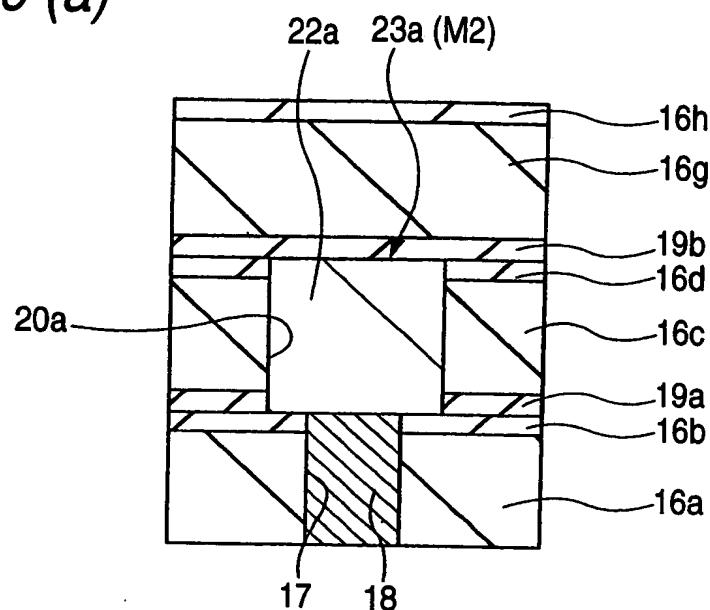


FIG. 89 (b)

